

Ex Libris AN *Biblioth.*
E S S A Y
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DISEASE PRODUCED
Medicor. BY THE *Edinens.*
BITE OF A MAD DOG,
OR
OTHER RABID ANIMAL.

H.c. 29 BY JAMES MEASE, M. D.
OF PHILADELPHIA.

WITH
A PREFACE AND APPENDIX
BY
J. C. LETTSOM, M. D. F. R. S. &c.

—THE POISON KILLS,
THE BITE CONVEYS IT, DEATH LURKS IN THE TEETH
Lucan. Pharsa

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TO
BENJAMIN RUSH, M.D.
PROFESSOR OF THE INSTITUTES,
AND OF
CLINICAL MEDICINE,
IN THE
UNIVERSITY OF PENNSYLVANIA.

To whom can the following pages be inscribed with so much propriety, as to you, honoured Sir, by whom my studies in medicine have been directed; and from whose publication, I received the first hints which led me to adopt the principles contained in this dissertation? Be pleased, therefore, to allow me to dedicate this Essay to you, as a small mark of respect from,

Much esteemed Sir,

Your affectionate and grateful pupil,

JAMES MEASE.

Philadelphia, May 7, 1792.

TO
ANDREW MEASE, M. D.

OF STRABANE, IRELAND.

HONOURED SIR,

ALTHOUGH related, yet personally unknown, I have taken the liberty to inscribe to you, likewise, the inaugural fruits of my studies in medicine: at the same time, I beg leave to express the high sense I entertain of the honour you have conferred, by your instructing and friendly correspondence, upon

Your affectionate Nephew,

JAMES MEASE

Philadelphia, May 7, 1792.

ADVERTISEMENT

TO THE

R E A D E R.

THE following Essay was transmitted to me by my esteemed friend, Dr. RUSH, with permission from the Author, a young gentleman of abilities that promise to do equal honour to medicine and to his country, to dispose of his performance in any manner I might deem most conducive to public good.

The great importance of the subject of discussion, and the ingenious and practical manner in which the author has elucidated it, induce me to think it worthy of republication.

Many practitioners are well acquainted with the interesting cases communicated by Dr. Shadwell, which appear to have been cured by the internal and external use of sweet oil. But in order to concentrate

centrate and render more generally known every interesting fact respecting the bite of a mad animal, I have added in the Appendix, with the consent of my learned friend, Dr. Shadwell, the whole of his memoir, as well as the remarks by my respectable correspondent, Dr. White, both published in the third volume of the *Memoirs of the Medical Society of London*.

It might be contrasted here, that one of the patients of Dr. Wolf, of Warsaw, had two pounds of oil poured down his throat; he also had mercurial ointment applied externally, and took calomel and bark internally—he was plunged occasionally into cold water—he died the third day. Another patient, treated much on the same plan, died on the fourth day. The Doctor, after trying various other remedies, concludes, “Thus we see that the bark, the mercury, the acids, the musk, the feeding on the most famous herbs, the sweating, the cura antiphlogistica, are no specifics.”

M. Desfault, a French writer, relates some cases of supposed efficacy, from the use of mercurial ointment; but Dr. Raymond, of Marseilles gives instances of the inutility of mercury even as a preventive.

I ought

I ought not to omit mentioning here, that a very ingenious surgeon, near London, has communicated to me a case of Rabies Canina, wherein the patient was treated in the manner recommended by Dr. Shadwell, but without success. I have heard that it has likewise failed in another instance, after a careful perseverance in this mode of treatment. Whether or not this may be owing to some variety in the Rabies hitherto unknown, cannot be determined; but every information respecting this melancholy disease ought to be made as public as possible, that, by combined experience, the most rational and effectual mode of treatment may be ascertained, or improvements discovered.

Were a person recently bitten by a mad dog to come under my care, I should immediately order the part bitten to be carefully washed with cold water, as recommended by Dr. Haygarth (Appendix page 150, and by Dr. Percival, page 153), or by means of a syringe, frequently and forcibly wash and clean the wound with cold water, for at least some hours; and then, were the operation not hazardous to life, cut out all the wounded flesh, and keep up a discharge from the part as long as possible. Should this plan have been neglected,

glected soon after the melancholy accident of the bite, the moment the practitioner is informed of it, even were it several weeks or months afterwards, the hydrophobic symptoms not having supervened, cutting the part out that had been bitten should even then be insisted on. If, from timidity, or any other cause, the patient should object to the knife, a caustic or cautery must be substituted; or even scarification, and cupping, if the other means are objected to; at the same time, the Peruvian bark should be freely given internally, for at least one week, and repeated again as long, after every interval of one week, for some months. In these intervals the patient might take steel or any other tonic; or, what I should deem preferable, use the cold bath every other morning; and where it can be procured, the sea bath.—Indeed upon no consideration whatever should cold bathing be neglected, which, to the most timid and delicate, may be applied in one form or other.

If after all these means have been in vain attempted, or under whatever circumstances it may happen, that the hydrophobia should supervene, I know of no mode to be pursued so likely to ensure success, as the external
and

and internal use of sweet oil, as recommended by Dr. Shadwell; or what may be full as well, to give oil internally, and to anoint the body with mercurial ointment, in such a free manner, as to produce, if possible, a ptyalism.

JOHN COAKLEY LETTSOM.

LONDON,
JAN. 1, 1793.

P R E F A C E.

FROM the first period of my studies in the science of medicine, no disease that I met with in books, engaged so much of my attention as that consequent on the effects of the poison of a mad dog, or other rabid animal, on the human body. I early deemed it an object worthy of enquiry; but the primary cause of my attention being immediately called to the complaint, was in consequence of a paragraph being inserted in almost all the newspapers in this city, in the month of January 1790, taken partly from Boerhaave, in which the disease was described in the most erroneous and dreadful manner; and the Tonquin remedy recommended at the same time, as an infallible preservative and cure. The consideration of the very great uneasiness the piece alluded to would excite in

the minds of the people, together with the certain death that would ensue from an improper confidence being placed in the medicine, induced me to pay an immediate attention to the investigation of the disease. The very publication, however, would have been sufficient to take away any confidence that might have been put in the remedy it recommended, or any other whatever, if the assertions respecting the disease had been credited. The very numerous cases that I had met with in authors, of the failure of the Tonquin remedy, and a persuasion of its inefficacy, grounded from reasoning on the known qualities of the ingredients which enter into its composition, as suited to counteract the symptoms they were intended to relieve, induced me to determine at once as to the total inefficacy of this once famed remedy.

In a short essay on the disease, which I drew up and inserted in the American Museum for August 1790*, I combated the many erroneous opinions with respect to it, and particularly attended to a comparison of the different methods of cure hitherto employed. On a con-

* Vol. VIII. p. 68.

templation of the whole of these, I was convinced of their total inefficacy, from their uniform failure, in every case where they had been used. None seemed more rational, of any that had hitherto been untried, than that hinted at by Dr. Rush, in an essay on the tetanus, contained in his volume of Medical Inquiries and Observations, published the preceding winter. In the appendix to that essay, he more particularly noticed the great similarity between tetanus, and the disease consequent on the bite of a rabid animal, and advised the same tonic remedies in the latter, which he had found so successful in the former. In the essay above alluded to, I concluded with declaring my readiness to adopt the opinion of Dr. Rush, with regard to the propriety of the application of the same mode of treatment to both diseases, which, from reasoning on their causes and the phænomena they exhibited, I was fully convinced was founded in truth.

Repeated reflection on the same subject, since that period, has served to strengthen me in the idea of the truth of the opinions I then delivered, and has induced me to take a much more enlarged view of the subject than I first intended

intended. How far I have succeeded, does not become me to say ; the decision of this question rests with the public—I do not pretend to infallibility, and therefore declare, that if, from future observation, and maturer judgment, I shall find that a single opinion advanced in the following pages is erroneous, I will readily retract it. I shall therefore, as cheerfully receive any objections offered to my opinions, as I shall be made happy by observations or remarks tending to confirm them: and whether they are offered in print, or I am privately informed of them, they shall be duly attended to, and answered in their respective modes of communication.

As to the language of my dissertation, I have endeavoured to be as clear and perspicuous as possible; and although I was fully sensible, how much elegance of style would influence the opinions of some, as to the merit of the work; yet this was not so much attended to as the matter. I also reflected, that however pleasing a well turned period may be to the ear at the time of its perusal; that finally it is sound argument which will stand the test of philosophical examination.

I shall

I shall conclude this Preface by remarking, that notwithstanding we are indebted to accident for many of the most important discoveries in medicine, as well as in the sciences in general, it is nevertheless an humbling consideration to human pride, that it is seldom any truth is perfectly established, until all the errors relating to it are first pointed out. If, therefore, my labours have been attended with no *positive* good, but are merely *negative*, by shewing the fallacy of many supposed truths, concerning the subject of my dissertation, I shall think myself fully rewarded. I may, by these means, induce others to extend their researches, and finally become the *indirect* instrument of stopping the ravages of a disease, hitherto the most *fatal*, and certainly the most *dreadful*, to which human nature is subject.

JAMES MEASE.

PHILADELPHIA,

MAY 7, 1792.

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AN ESSAY
ON THE
DISEASE PRODUCED
BY THE
BITE OF A MAD DOG,
OR OTHER
RABID ANIMAL.

THE fatal effects that have hitherto followed the action of the canine virus on the animal system, have in every age occasioned it to be justly viewed with horror. Indeed, whether we consider the peculiarity of the symptoms, or the total inefficacy of the medicines which have been used for its relief, no disease to which human nature is liable demands a more serious attention. The variety of opinions entertained by physicians respecting this disease, and their very great contradiction, is the surest proof of the little knowledge we possess concerning it.

In the following dissertation, I shall be under the necessity of opposing many of these opinions; but
A with

with what success, the sequel of this Essay must discover : without, however, any further preface, I shall enter on my subject.

HISTORY OF THE DISEASE.

IN imitation of the practice followed by almost every writer on diseases, it will be expected, that I should enter into the antiquity of the one that I have chosen for the subject of this dissertation.

On this, as well as on all other occasions which admit of doubt, or an opportunity for cavilling, there have been endless disputes : but as it rather affords matter of curious speculation, than a deduction of any practical utility, I shall decline entering fully into the discussion of the question, especially as, in my opinion, it can be very easily decided.

Respecting the first appearance of the disease, I deem it impossible to speak in a positive manner. The most probable opinion is, that, as dogs have existed in all ages, this disease was of very ancient date. From the circumstance of its not being mentioned by Hippocrates, some authors, as Plutarch, and after him M. Le Clerc *, have insisted on its origin at a later period ; viz. in the time of

* Le Clerc, *Hist. de la Med.* part ii. p. 463.

Asclepiades, who was physician at Rome in the 62^d year of the Christian æra. But, although it is not noticed by Hippocrates; yet, as Van Swieten * observes, this “ amounts to no proof that the distemper was not in being in his time. It might perhaps be less frequent in the parts which were inhabited by Hippocrates; since Aurelian † tells us, that this is a distemper not alike common to all countries.” I shall hereafter mention also, that in some places the disease did not appear for a long time, and that others are entirely exempt from it, as far as we have any account, to this day. But although no particular time can be ascertained at which the disease appeared, yet we have the most positive proof of its having been known at a much earlier period than that of Asclepiades. Homer, in the ninth book of the Iliad ‡, introduces Ulysses, when on an embassy to Achilles, to request his return to the Grecian camp, comparing the fury of Hector to the rage of a mad dog. Achilles, it is well known, studied medicine under Chiron; and therefore, as Dr. James justly observes, “ was the more capable of receiving an idea of the mischief Hector did to his countrymen by this meta-

* Comment. in Boer. aphor. 1129.

† De Morb. Acut. lib. iii. p. 229.

‡ Line 237.

“phor*.” From this it appears evident, that the disease is of very remote antiquity, as it certainly must have been known even before the time of Homer, although he is the first author from whom we have any account of it.

This disease is generally said by authors to be peculiar as an original affection to the three species of the genus *canis*; viz. dogs, wolves, and foxes. No other animal, upon which any accurate observation has hitherto been made, has been known to be seized with it in a spontaneous manner, except those mentioned, although all are capable of becoming affected with it, in consequence of a bite, from any of the former †. Cats, indeed, are said to have

* Philosoph. Transf. vol. XXXVIII. p. 249. In the 8th and 13th books of the Iliad, Hector is also compared to a mad dog both by Teucer and Neptune.

† Throughout the whole scale of animated nature, we may observe a general law prevailing, whereby certain diseases belong to certain ages, conditions, and kinds of animals. Thus the present disease is peculiar to the canine genus, as an original affection, although man as well as other animals are liable to be affected therewith in consequence of a bite; on the contrary, there are some diseases to which mankind are peculiarly obnoxious, and which it is impossible to communicate to brutes. Thus, in repeated experiments, Mr. Hunter could never inoculate a dog, bitch, or an ass, with the venereal disease. Treatise on the Venereal Disease, chap. i. sect. 6.

The

have been seized with it spontaneously ; and the excellent Morgagni remarks *, that, after dogs, he knows of no animals more liable to the disease than cats. If this be true, and these animals are seized with it originally, independent of a bite, an inquiry immediately offers itself, why other animals belonging to the same genus are not affected with it in a similar manner. Aurelian † mentions its appearing spontaneously in leopards : but I apprehend, from the same observation having never been made by any succeeding writer, and his not having sufficient opportunity to make the remark, that it is

The same observation is likewise applicable to man : the Indians in Nantucket, many years ago, were carried off by diseases which never affected the white inhabitants among them. Dr. Lining tells us, that the negroes were never afflicted with the yellow fever in South Carolina, although constantly around the sick ; and these again have diseases peculiar to themselves, to which the whites are entire strangers.

* Morgagni on the Seats and Causes of Diseases, Letter LXI. art. 15.

† This inquiry was suggested to me by that excellent physician, and learned natural historian, Dr. Samuel L. Mitchell, of the state of New York, in a letter which I received from him, dated the 29th of January 1792.

“ The genus *felis*,” says he, “ to which the domestic cat belongs, has a great number more of species than the *canis*; and it is not a little strange, that though it is reported, that the house cat has been originally affected by Hydrophobia ; yet, that wild cats, lions, leopards, panthers, and *other species* of the genus should never have it, but in the derivative way.”

without foundation, and only taken for granted as a probable circumstance; “as these animals constantly dwell in the caves of great woods, remote from human society, and if they happen to fix their jaws upon men, it is commonly with the fatal view of slaughtering them*.” To enter into an investigation of this inquiry would lead me too far from the main object of this dissertation; and would, I fear, from the difficulty of obtaining a sufficient number of facts, be attended with but little success: I shall, therefore, leave it for those disposed to engage in the undertaking, and pass on to another in which I am more interested; I mean an examination of the question, Whether the disease, which we are considering, ever arises spontaneously in the human body, without the bite of a rabid animal?

Notwithstanding the relation of many cases, by different authors, of spontaneous Hydrophobia, I doubt much whether it ever appeared as an original disease. In respect to some of them, it may be with propriety questioned, whether the symptoms they described pertained to the actual disease: for, from a careful perusal and attentive examination of the many histories on record, the dread of fluids appears to me to be no more than a symptom

* Van Swieten Comment. Aphorism 1132.

of an original disease, which, from its being particularly urgent, has been mistaken for an idiopathic affection. Thus Dr. Innes * has given an account of a Hydrophobia attending an inflammation of the stomach; but the impropriety of the name will at once be evident in this case, as there must have been an equal dread of both solids and liquids, on account of their increasing the disease †; but as the great thirst under which the patient laboured, induced him only to call for drink, which from his sensations he knew he could not swallow, the aversion from it was the cause of the disease being stamped with the name.

In other cases also, where the disease was said to have appeared without a bite, I am convinced that they were no more than cases of Tetanus, both from the causes that induced them, and from the known circumstance of an aversion from fluids taking place in that disease. Mr. Arthaud ‡ relates the history of a spontaneous Hydrophobia, which is an exact description of Tetanus. It was brought on by the person being exposed to the

* Edinb Med. Essays, vol. I. p. 226.

† Gastritis,—pyrexia typhodes, anxietas in epigastrio, ardor et dolor, *ingestis, quibuscumque auctus*, &c. Cul. noso. method. genus 15.

‡ Recherches sur la Malad. Epizootique de Saint Domingue, vol. I. p. 220.

alternations of violent heat in the day, and cold and damp at night, in the island of Hispaniola, which in that island, as well as others in the West Indies, are among the most frequent causes of this disease. In other cases of this supposed disease, they may be with as much propriety termed fits of mania, or violent delirium in fevers. Thus Van Swieten relates the history of a man from Boerhaave, who, after being exposed to a scorching sun, and drinking at the same time a quantity of spirituous liquors, fell into a most *ardent fever*, and with great horror refused all liquors that were offered him*. Sauvage† also mentions a case, where a malignant remitting fever was attended with a perpetual delirium, convulsions, and *dread of fluids*. Dr. Mead‡ relates, that he saw palpitations of the heart, accompanied with a *dread of fluids*; but here, in my opinion, it was a mere symptom of hysteria; in which disease the same author also observed it to take place. The disposition to the marvellous, which is so fully shown by almost all the old writers in medicine, their extreme credulity, and the little attention generally paid towards inquiring any further than the surface of things, have been another cause of their mistaking the real nature of this disease. Many of them,

* Van Swieten. Comment. 1130.

† Sauvage, Nosolog. Method. vol. I. p. 354.

‡ Mead's Works, p. 81.

likewise, as Dr. Vaughan * remarks, “ are so deficient in point of accuracy, as to leave the reader “ in suspense as to the fact for which he consults “ them,” and therefore deserve any other name as well as that of Hydrophobia. From the ignorance of the patients also, I am inclined to imagine, that many cases, said to be spontaneous, have actually proceeded from the bite, which, having been either slight, or received at a considerable distance of time, has been overlooked, and the true cause consequently neglected. In other instances, a difficulty of deglutition, or spasmodic affection of the muscles of the throat simply, has been magnified into a Hydrophobia: this appears to me to be the explanation of the case related by Marcellus Donatus †. A violent surfeit in a boy, from eating beech nuts, caused a fever, delirium, spasmodic affections, &c. is also said to have been accompanied with a dread of water ‡. But this appears to be no more a case of the disease in question, than the dislike to water from eating an unripe persimmon, or any other similar astringent vegetable, deserves the name of Hydrophobia. The disagreeable effect of these fruits on the mouth and throat is well known, and the beech nuts appear to have induced a similar state; a delirium accompanying the latter case,

* Vaughan’s Cases and Observations on the Hydroph. p. 40.

† Marcellus Donatus, lib. iv. chap. i.

‡ Med. Museum, vol. II. p. 98.

made the aversion from drinking more remarkable, and more nearly to resemble the original disease depending on the virus.

But why should this disease be thought to arise spontaneously any more than the small pox, venereal disease, or any other depending on a specific contagion? I will not deny, that an *aversion* from *swallowing fluids* has occurred in no other disease but that proceeding from the bite of a rabid animal; I have already mentioned its occurrence in tetanus, hysteria, and other diseases. All I contend for is, that such cases as are called spontaneous instances of the disease, are not accompanied with the other symptoms which so characteristically designate the idiopathic affection. The same mistake has been made in calling every emaciation of the body a *consumption*; when, accurately speaking, and according to the definition of the disease, no such emaciation deserves the name of consumption, but that which is accompanied with a local, though not primary, affection of the lungs, constituting the disease, and understood by physicians by the name of Phthisis Pulmonalis.

The falsity of the idea of an actual and idiopathic Hydrophobia arising in the human body, without the action of contagion for its production,

tion, I hope, is now evident, and I shall therefore proceed to deliver the

HISTORY OF THE SYMPTOMS.

AT various and indeterminate periods of time, after the introduction of the poison by a wound in any part of the body, it most commonly begins to shew itself by sharp pains in the place where it was received, shooting in every direction to the neighbouring parts, and frequently to the stomach, throat, and bowels; at the same time there is a sense of lassitude and languor, and an aversion from motion, shewing evident marks of a general debility, such as usually precede the attack of a febrile affection. The flying pains continue to increase, and, seizing the urinary organs, create a difficulty and heat in discharging the urine. A pain is also felt at the *scrobiculus cordis*, or pit of the stomach; and a sense of constriction about the fauces and throat, occasioning a difficulty of swallowing. These symptoms are accompanied, or immediately succeeded, by restlessness, and anxiety about the *præcordia*, occasioning a frequent change of posture, and sighing; and the most exquisite sensibility prevails over the whole body; particularly in the organs of sense; light becomes painful to the eyes; a sudden noise occasions involuntary startings; and the air, although to persons in

health it be of an agreeable temperature, feels cold and disagreeable. If at this time, or before, the person incline to sleep, it is short, disturbed with frightful dreams, and on awakening he is apt to fall into slight convulsions. The eyes also are fierce and penetrating *, the countenance exhibits a peculiar anxiety †, and a sense of despair; and frequently changes its aspect ‡: a copious secretion of saliva now takes place; but notwithstanding the sick are troubled with a very great thirst, the difficulty in swallowing, which before this time could be easily overcome by a firm resolution §, now becomes so great, that an attempt to swallow, especially liquids of any kind, whether by compulsion, or with a view of mitigating their thirst, never fails to excite the most disagreeable sensations; they are seized with violent agitations; a ball, as it were, rises from the stomach up to the throat, and seems to threaten a suffocation; the muscles of the face become variously contorted, and the exertion is frequently succeeded by convulsions. Vomiting at this time frequently take place; and the constriction about the breast and the difficulty of breathing become so extreme, that if a blast of air blows on them, they are seized with the greatest

* Vaughan's Cases and Obs. on Hydroph. p. 6. 24.

† Med. Transact. vol. II. p. 46.

‡ Fothergill's Works by Lettsom, 4to. p. 353.

§ Med. Comment. vol. XI. p. 304.

distress, cover their mouths, and seem ready to expire, as if struggling for breath. A fever sometimes occurs, preceded by slight shiverings, but it is in general very mild, and does not often appear.

The pain in the bitten part, at this period of the disease, has generally vanished; and a numbness*, or paralytic affection of† it succeeds, with an increase of the violence of every symptom already mentioned. A recumbent or horizontal posture aggravating their complaint‡, the sick commonly either sit up, or walk about: the flow of saliva becomes extremely troublesome from its viscidness, and the inability to expel it; the breathing is very laborious and difficult, and being quickly repeated, and attended with a constant and peculiar kind of hawking, in order to evacuate the saliva, has been thought to imitate the barking of dogs. The irritability of the system has by this time arrived to such a morbid degree, as occasions it to be thrown into convulsions by the slightest causes, but by none in so ready a manner, as an attempt to swallow fluids; nay, the bare mentioning of an action so recent in

* Edin. Med. Essays, vol. V. part ii, p. 97. Philosoph. Transact. abr. by Lowthorp, vol. III. p 288.

† Mead's Works, p. 661.

‡ Hamilton's Remarks, p. 196. Mem. Med. Society Lond. vol. I. p. 255. Vaughan's Cases, p. 23.

their minds, and severely painful in its consequences, excites a return of their symptoms, and occasions the greatest distress *. Even the sight of water or other fluid, or of any thing having the least resemblance to it, such as a looking-glass, or any white substance, whereby an occasion will be given for the renewal of the idea of their former pain, will have the same effect. At this period also, solids become equally difficult to swallow, and the bare mention of even them has excited the same convulsions as that of fluids †. In this advanced stage of the disease, when the general disturbance has prevailed for such a length of time, slight fits of delirium occasionally occur; the patients frequently forget their friends and relations. This delirium is attended with a constant talking; but even at this time, they have the power of summoning themselves; and soon becoming collected, return rational answers to the questions proposed. At other times, for the chief part, they have the most perfect enjoyment of their senses to the last. The pulse, which during the former period of the disease was but little altered from the healthy standard, except being less strong, now becomes evidently weak, quick, and

* Hoc tempore quoque in hominibus priapismus incidit, cum scroti contractione, & feminis involuntariâ frequente emissione.

† Edinb. Med. Commen. vol. XI. p. 304. Mem. Med. Soc. vol. I. p. 260.

intermitting. False vision, dulness of sight*, together with a dilatation of the pupil†, and sometimes actual blindness‡, now appear; quantities of saliva are collected in and about the mouth, and being mixed with air taken into the lungs, puts on a frothy appearance, which the patient is constantly endeavouring to get rid of, by wiping it with a handkerchief, or spitting it about with great force. The voice becomes very hoarse, and at the same time the convulsions increase in frequency and force over the whole body. Spasmodic affections take place in the muscles of the face, occasioning violent contortions, and the most horrid assemblage of features; and in the muscles appropriated to moving the lower jaw, inducing involuntary quashing, and a grinding of the teeth, which some have construed into a desire of biting.

The strength now fails—the extremities become cold, and death in a short time relieves the miserable patient from his sufferings; sometimes expiring with convulsions, as if from a suffocation, and other times in a calm and placid manner.

* Med. Communications, vol. I. p. 215.

† Mead's Works, p. 660. Hamilton's Remarks on Bite of a Mad Dog, Lond. 1785, p. 199.

‡ Med. Obs. and Inq. Lond. vol. III. p. 368.

The above is the common progress and order of the symptoms produced by the canine poison on the system. But a variation from them often takes place in different persons, which it is proper I should mention, previously to proceeding any further on the subject*.

Notwithstanding a pain in the bitten part, generally is the first symptom of the action of the poison, yet in some cases it has been entirely absent, and where the person has been ignorant of the cause of his symptoms, it has never been mentioned through the whole course of the complaint. This was the case with Mr. Bellamy, as related by Dr. Fothergill †; also with the person whose history is

* A circumstance that I have omitted mentioning in the History of the symptoms, was the terror the patients are said to be struck with at the sight of a dog; because it is only mentioned in those cases where it is said the persons were acquainted with the cause of their disease, and therefore by dwelling on the idea of their sufferings, may very readily have conceived in their delirium that a dog was present, which they have accordingly desired might be taken away. I can readily assent, however, to another thing commonly taken notice of, viz. the convulsions excited by the barking of a dog; but this arises solely from the very great sensibility of the sick, by which this, or any other sudden noise, as shutting a door, a blast of wind, &c. produce the same effects.

† Fothergill's Works, 4to, p. 353.—Med. Commun. vol. I. p. 214.

related

related by Dr. Lister *, and with many others whose cases are on record in books of medicine.

A considerable variety is also observed in the first symptom of the general affection, even when this is not shewn by the pain in the bitten part. In some, the urinary organs are first affected †, while in one of Dr. Vaughan's ‡ patients, as well as Wilbraham's §, and others, the stomach, bowels, and throat, were the parts on which the disease first shewed its effects.

The disposition which has hitherto almost universally prevailed among authors, to divide diseases into stages, has also extended itself to the one whose history I have now delivered. Each of these stages is described as having a peculiar and appropriated set of symptoms, never occurring in any other stage, and which uniformly remained the same in all cases. But had these descriptions been drawn up from the many accurate relations of cases of the disease on record, rather than copied from preceding systematic writers, it would have been found, that a difference of circumstances, as those of constitution, and age, would have made a material differ-

* Philosoph. Transact. vol. III. p. 277.

† Fothergill's Works, p. 353.

‡ Vaughan's Cases, p. 4.

§ Philosoph. Transact. abridged, vol. XLVII. p. 43.

ence in the progress of the symptoms, in different persons. This variation of the symptoms in the present disease, has already been pointed out, and is particularly observable in the pain at the bitten part, which although generally a symptom of the first stage, frequently does not appear through the whole course of the disease.

Dr. Duncan * has divided the disease into stages, though in a somewhat different manner from other authors. But although I have the highest respect for the authority of this excellent physician, from whose industry and labour I have derived much information, yet I cannot assent to his division, as I do not find it supported by the cases on record. The affections of the *vital functions*, which are said by him to mark the commencement of the *second stage*, are very general among the first symptoms of the disease: for, as Dr. Seleg observes, “it begins “with the disorder before the dread of water takes “place, increases with it, and attends to its last “stage, till at last the patient expires under it†.” The affection of the *mental* faculties, which is said to mark the third stage, is an equally uncertain sign whereby to designate any particular period. For while a delirium sometimes takes place very early

* Heads of Lectures on the Theory and Practice of Med. Edinb. 1785, p. 227

† Medical Museum, vol. II. p. 110. Lond. 1781.

In the complaint, at other times it never occurs during its whole course, the sick having the most perfect enjoyment of their senses* ; and most commonly the mental faculties are in a superior state of excitement. This is shewn by their quick perception, amazing acuteness of understanding, and the rapidity with which they answer questions. Thus, Dr. Howman† gives us a case of a patient, whose "reason was all along very good, and, as some "observed, better than in health." Dr. Vaughan likewise remarks, in the history of the third person whose case he relates, that "his intellectual faculties seemed quickened by disease." For this reason, therefore, that the divisions hitherto attempted by authors, were in a great measure arbitrary, not being bounded by any particular set of symptoms, as well as from a conviction, that if it were possible to establish them, no useful deduction could be inferred from them in the *removal* of the *disease*, I determined to take no notice of them, but to mention the symptoms, in the order they appear most generally to follow.

From a consideration of the variety of the symptoms, and the strong manner in which they are

* London Med. Obs. and Enq. vol. III. p. 356.—Hamilton's Remarks, p. 196.—Vaughan, p. 29.

† Philos. Transact. vol. III. p. 281.

marked, it would, on a first view, seem very probable that the greatest advantage or information would be derived respecting the pathology of the disease, from the dissection of the bodies of those dying of it. Accordingly, we have very numerous histories of the appearances after death, related by many authors; but on account of their extreme variety and want of uniformity, and the circumstance of their all being the consequence, and noways connected with the cause of the disease, it is impossible to draw any conclusions from them. The excellent Morgagni, although he relates the dissections of many cases, does not pretend to draw any conclusions from them, but observes, that as “there are many things
“in which these patients, while living, differ one
“from another, so there are not fewer, but even
“more, in which their bodies differ after death*.” The violent convulsions that are observed to take place in the muscles of the throat when an attempt is made to drink, constituting one of the most remarkable symptoms of the disease, naturally turned the attention of physicians towards the examination of that part after death. A slight degree of inflammation, or rather redness, in the superior parts of the trachea or windpipe, has sometimes appeared, but in others no marks of any such redness have

* Morgagni, letter VIII. art. 30.

been found, and where it occurs, as Van Swieten observes, "it rather seems to be an effect or consequence of the distemper, than a productive cause of it," arising from the frequent convulsion of the parts. The epiglottis has also been observed to be crisp and dry in some cases: but a more general circumstance attending after death, is the quick tendency of the bodies to putrefaction.

I shall now proceed to the rationale of the symptoms, or investigation of the disease.

First. The *extreme sensibility* of the whole system to the external air, and the disposition to be thrown into convulsions by slight stimuli, is one of the most remarkable symptoms attending this disease. To attempt a full explanation of it, would be a difficult, and, I fear, an impracticable undertaking; but although the particular charge induced on the nerves, cannot be ascertained; yet so far we know, that the poison, by its action on those organs, deprives them of the power of performing their proper functions, by which the above morbid sensibility is induced*.

* This state of extreme sensibility to the air has been remarked as far back by physicians as the time of Aurelian, and constantly noticed by every writer on the disease: hence the patients were said to labour under *ærephobia*:

Second,

Second. The theory of convulsions being so very generally delivered by every pathological writer, needs no explanation in this place.

Third. The singular *oppression* and *distressing anxiety* at the præcordia, or round about the breast, which occur so early in the disease, and continue to oppress the patient, merit a particular explanation.

Dr. Heysham* resolves them into an unequal determination of the blood from the vessels of the superficies to the larger ones near the heart and lungs; but we have no proof of this undue determination; and I am rather disposed to ascribe them to the irritation of the nerves of the lungs, and especially those of the bronchia, whereby their cavity is contracted, and a morbid sensibility induced: hence the application of the air to their surface proves highly painful. A full distension of the lungs, therefore, cannot take place, and this occasions a more frequent respiration, which then becomes in some measure voluntary, and of course very tiresome: anxiety will then follow, together with the difficulty of breathing, so much complained of.

* Dissertat. Inaug. chap. xi.

The palpitations, ascribed by Dr. Heysham to the collection of blood, or to its unusual determination to the heart, are not owing to this cause, but merely to the nerves of that organ partaking of the general irritation pervading the system, by which they excite the heart to more frequent contractions. The occurrence of the same symptoms in hysteria, and other nervous disorders, and from the same cause, is a further proof of this opinion. No such symptom, as a palpitation, takes place in those diseases, where there are the most unequivocal proofs of the heart being oppressed. In this case, a violent increased action of the heart and arteries, which is shewn by a full and hard pulse, is the only consequence.

Fourth. The violent pain experienced at the *scrobiculus cordis*, or pit of the stomach, appears to arise from the irritation of the nerves supplying the diaphragm, whereby it is thrown into inordinate contractions. That this muscle is affected, is rendered also probable by the hiccoughing which sometimes occurs. How far the diaphragm is concerned in the affection of the throat, I will not pretend to say. Dr. Vaughan, indeed, asserts he was led to believe, that in “this disease a new *sympathy*” was established between the *fauces* and *diaphragm*; “and that the latter was drawn into a most severe
“spasm,

“spasm, as often as any offending cause operated upon the former*.” The connection, however, between these parts is certainly great, and was long since observed. Heister informs us, that in a case of inflammation of the diaphragm, he observed the power of swallowing destroyed; and a difficulty of deglutition, from a contraction of the diaphragm, we know takes place in a fit of hysteria†.

Fifth. One of the most remarkable symptoms attending this disease, which from the early notice taken of it, and the circumstance of its general predominance, has given a name to the disease, is the intolerable aversion, shewn for the most part by those who labour under this disease, from water and fluids of all kinds. This has never as yet been satisfactorily accounted for; for which reason, and because its solution will tend to render the complaint of a much more simple nature than it hath hitherto been considered, I shall spend some time in investigating its cause.

The idea generally entertained by authors respecting this symptom, is, that it is owing to some change induced in the system, from the action of the poison on it, whereby a *specific dread* of fluids is

* Vaughan's Cases and Obs. p. 47.

† Haller Opus. de Musc. Diaph. No. 36.

induced,

induced, independent of every other cause. But I hope I shall clearly prove, that it is entirely owing to an affection of the throat, from whose morbid sensibility, and the inability of swallowing, together with the pain excited, this symptom seems wholly to originate.

Salus Diverfus, indeed, was the first who disbelieved this doctrine, and came nearer the truth than any of his predecessors, by referring the aversion from drinking to the circumstance of the patients finding themselves worse after taking any fluid *. *Dr. Whytt* † likewise entertained a similar opinion: for he observes, that “the *Hydrophobia*” is only a violent convulsion of the gullet and “stomach, arising from the disagreeable sensation” excited by the liquid touching the fauces.” But neither of these explanations is satisfactory: the former does not inform us of the ultimate cause of the sick being rendered worse by swallowing liquids; and the latter, by the above quotation, and in other parts of his work, resolves it into the specific stimulus of water on the throat.

The explanation, therefore, that I would propose of this symptom is as follows: In consequence

* *Salus Diverfus de Venenis*, p. 349.—*Van Swieten*, *Comment. Aph.* 1138.

† *Whytt's Works*, p. 680. 4to.

of the action of the poison on the nerves of the body, as before mentioned, a morbid and excessive degree of sensibility is induced, whereby the action of the slightest stimuli produces the most disagreeable effects. The fauces also, particularly the muscles employed in deglutition, partake of this general morbid state; as soon, therefore, as any liquid touches them, they are seized with spasmodic affections, which consequently excite pain; in the very irritable state of the parts, this pain becomes extreme; on a second attempt, therefore, to drink, or a mere mention being made of it, the idea of the patient's former sufferings will be immediately excited, and consequently he will refuse it with disgust.

But even this pain may be excited by the irritation of the saliva on the very irritable fauces, whereby an attempt will be made to swallow it, and this gives the first idea of disgust to fluids, before any exertion has been made to drink *. Accordingly the patient will endeavour to avoid a repetition of an act which excited so much pain, and any liquor will be refused afterwards; or the mere

* "To ask one in this condition to drink, is to desire to choke himself; and when he has found this to be so, he dreads the sight of liquors offered to him, as much as he would a knife presented to his throat, and strives to keep them from his mouth." Mead's Works, p. 83.

sight of the water, renewing the idea of his pain, will produce the same effect. This explains the cause of the terror shewn by some persons in the first stage of this disease, before any attempt has been made to drink; and which has seemed to establish the common idea, that the aversion from fluids was not owing to a difficulty of swallowing, but to a specific dread of them. Thus Sauvage* relates the case of a butler, who was unable to support the sight or touch of water, though he had not as yet made any attempt to drink: and Mr. Babington† also mentions, that the boy, whose history he describes, “ shewed evident agitation at the sight of a cup of mint water poured out for him to drink.” But the disease had at this time subsisted for several hours, and therefore his age, and probably his constitution, favoured the increase of that morbid sensibility which it is the nature of the poison to induce on the system. The affection of the throat, then, contrary to the opinion of Van Swieten and Dr. Heysham, precedes the aversion shewn from drinking; for the former are very frequently, with the stomach, the first parts attacked, as mentioned before, and occurred in a remarkable manner, in the cases related by

* Sauvage sur la Rage, p. 12. Van Swieten, Comment. Aphor. 1138.

† Med. Com. vol. I. p. 214.

Drs. Lister*, Wilbraham†, Vaughan‡, and Mead§; in these, therefore, the aversion from liquids appeared as a primary symptom; but in other cases, where from a variety of circumstances this affection of the throat or stomach did not come on for some time, water and other fluids were taken with the *greatest ease and composure*, until the commencement of the affection of those parts soon made them disgusted at the sight of it. Thus Dr. Lister remarks, that it was not until the fourth day after his patient first complained, that any aversion from drinking appeared; for, on the day preceding, “he called for burnt brandy, and drank it;” and it was not until the next day, when he perceived a strong rising in his stomach, that he had “an impotence to drink.” Dr. Howman also says that no aversion from water took place until the seventh day of the attack, and that preceding the death of the person, when the spasmodic affections became severe. Mr. Bathie’s || patient shewed no disgust to fluids, until the difficulty in swallowing came on; and he remarks, that when this occurred, “and the fluid touched the fauces it seemed at the

* Philosoph. Transf. vol. III. p. 276.

† Ibid. vol. XLVII. p. 413.

‡ Vaughan’s Cases, p. 4.

§ Mead’s Works, p. 660.

|| Edinb. Med. Com. vol. III. p. 290.

“ peril

“ peril of his life.” Dr. Vaughan *, in the history of his second patient, mentions, that he was attacked on Tuesday, yet he drank all that and the succeeding day, until the evening, and next morning, when the occurrence of a vomiting evidently shewed an affection of the stomach. In the case related by Dr. Gray †, it was not until the fifth day that any aversion from fluids was shewn. Morgagni ‡ remarks also, that there are some who will drink water itself without difficulty, when the first trouble of swallowing is overcome; and quotes two cases from the Ephemerides of the curious in proof of the assertion: and so fully convinced was Dr. Mead of the aversion from fluids depending on a difficulty of swallowing, that he said the name of the disease ought to be changed; and that instead of “Hydrophobia,” it should be called “Dyska-
 “taposis §.” But further, although these cases render it probable, that the dread of water, as it is called, succeeds, or at least appears at the same time with, the affection of the throat; yet that the former depends entirely upon the latter, is fully proved by this fact, viz. that in those persons where the throat was entirely free from any affection during the whole course of the disease, or

* Vaughan's Cases, p. 22.

† Med. Comment. vol. XI. p. 304.

‡ Letter 8th, art. 30.

§ A difficulty in swallowing. Mead's Works, p. 84.

where

where the violence of the symptoms had abated; water and other fluids were taken with the greatest composure. "A learned physician," says Dr. Mead, "has assured me, that in Shropshire he saw three patients in one year, yet none of them during the melancholy scene had any difficulty of swallowing, or shewed any signs of a dread of liquids." Dr. Houlston has also in the London Medical Journal * published a letter from a physician, where it is mentioned, that during an interval of sixteen hours, which took place in this disease, liquids of all kinds were swallowed freely. The third person, whose case is related by Dr. Dickson †, also drank several cups of tea in the latter end of the disease. The public papers ‡ last year gave us an account of a servant in one of the public inns near London, who died of this disease; and who, "to the astonishment of the attending medical faculty," drank in the progress of his complaint, freely and without the least discomposure, great quantities of liquids.

If, therefore, the aversion from drinking, most commonly shewn by those persons who labour under the effects of the canine poison, were owing to

* Vol. V. No. 4. for 1784.

† Med. Obs. and Inq. vol. III. p. 368.

‡ London Paper, Times, Nov. 30, 1790. Dunlap's American Advertiser, January 1791.

the poison simply, and some specific change wrought on the system, the absence of the affection of the throat, entirely in some cases, and its abatement in others, ought not to make the least alteration in this generally supposed pathognomonic symptom; for the poison being still in the system, its effects should invariably and constantly continue. But the direct contrary is observed to take place. How then can this specific dread be accounted an universal cause?

But further, another proof of the truth of the explanation I here have given, respecting the aversion shewn from fluids by persons labouring under the effects of this disease, is derived from the declaration of the patients themselves, who, as was said before, are most commonly possessed of their senses, and are capable of returning rational, collected answers to questions proposed to them. These constantly refer the whole cause of their disgust to fluids, to the difficulty in swallowing. Thus, in the case related by Dr. Hartley*, it is remarked, on being asked, “whether his aversion from drinking proceeded from any pain in *swallowing*, or *something else*?” he replied, “to a pain in *swallowing*.” Mr. Nourse’s† boy being

* Philosoph. Trans. abridg. by Martin, vol. XI. p. 225.

† Ibid. No. 445.

asked,

asked, why he had not taken any nourishment as desired, gave as a reason, that “ he could not swallow.” In the first case related by Dr. Mead *, the patient declared twice, on attempting to drink, *that it hurt him* to swallow, and threw the fluid out with violence. Morgagni † likewise takes notice, that the sick, “ when asked why they did “ not drink ?” have answered, that they could not, by reason of the great constriction and narrowness of their fauces, or *gula*, as Salius testifies, and Aromatarius confirms.

In another case ‡, the person expressly declared, “ he could not swallow for something in his “ throat, that interrupted the passage ;” and made exertions to suppress a vomiting, with which he was repeatedly threatened, for fear of increasing the obstruction in his throat.

So far from being afraid of drinking water, the sick lament, with the greatest anxiety, their inability to relieve the thirst which afflicts them, and by various contrivances endeavour eagerly to drink §. Mr. Bellamy || expressed no fear of water, but only

* Mead’s Works, p. 659.

† Morgagni, Letter viii. art. 19.

‡ Edinb. Med. Com. vol. III. p. 290.

§ Philosoph. Transf. abr. vol. III. p. 277.

|| Fothergill’s Works, p. 353.

complained of the difficulty of swallowing; others again express a desire to go into the bath*.

The consideration, however, that the same aversion from drinking happens in other nervous diseases, where the same spasmodic affection of the muscles of deglutition, and the same morbid sensibility occur, will also tend to prove the cause here assigned, and the total inutility of having any recourse to the poison, in order to account for this singular symptom. It was mentioned before, that Dr. Mead † observed it in hysteria: Drs. Percival ‡ and Rush § have recorded cases of its occurring in tetanus.

But it may be asked, if there be no specific dread of fluids, why are solids swallowed with less difficulty than liquids, contrary to what is observed of all other affections of the throat? To this I would reply, that a very material difference exists between an affection of the muscles of deglutition, proceeding from a state of inflammation, and a distension of the part, and that affection proceeding from the disease at present under consideration. In the former, liquids are swallowed with greater ease, as re-

* Vaughan's Cases and Obs. p. 34.

† Mead's Works, p. 82.

‡ Essays Med. Philosoph. and Exp. vol. II. p. 366.

§ Med. Inq. and Obs. p. 178.

quiring less exertion of the muscles than solids, which create great pain by increasing the preternatural distension already existing. In the latter, liquids are swallowed with greater difficulty for the same reason, viz. requiring more exertion of the muscles, of which the patient has entirely lost the command; but solids are enabled to descend with greater ease, as by their bulk they do not require such a forcible contraction of the muscles in order to force them down. It must be also recollected, that in performing the act of swallowing, the tongue is drawn backwards, and at the same time pressed against the upper and back part of the palate, extended over the roof of the mouth, whereby the substance is pressed against the epiglottis, which by its own elasticity is constantly at other times erect, and thereby effectually and completely covers the windpipe, directing the passage of the food immediately into its proper place or gullet; the extension and continuation of the soft palate at the same time preventing its regurgitation up through the nose. When, therefore, these parts are affected with a morbid sensibility, and the healthy action is taken away, as in the present disease, a *fluid* is no sooner applied to them, than a spasmodic affection is excited in the part, and they not being able to overcome this, it terminates in a violent convulsion: but *solids*, by their distension, overcome the stricture and resistance made to their progress by the convul-

convulsion of the parts, and thus they descend into the œsophagus with greater ease: they are also enabled to press down the epiglottis, which liquids, by their want of this distending power, are rendered incapable of doing. Fluids likewise, as Dr. Seleg observes, “penetrate the sides of the mouth, the tongue, and the throat much more, and produce therewith a greater irritation or commotion than the solid food can have upon these parts *,” in consequence of a greater surface, which is endowed with this morbid sensibility, being exposed to the stimulus of the fluid. In a state of health, when the muscles of the throat can be commanded at pleasure, and the nerves which supply them are not affected with a morbid sensibility, the action of deglutition is sufficient to press down the epiglottis, assisted by the slight gravitating influence of the fluid itself; but in the present disease, this healthy action of the parts being destroyed, there remains nothing but the mere mechanical force of the fluid to effect what was done by the united force of both before, which being unable to accomplish, a violent irritation in the part ensues, with great pain, and an immediate rejection of the liquids.

This explanation is greatly strengthened by the consideration of this circumstance, that in other

* Med. Museum, vol. II. p. 228.

diseases where there is the same want of command of the muscles of deglutition, solids are swallowed with greater ease than liquids; but from the same morbid sensibility of the parts not accompanying the disease, the latter do not excite so much pain, as in the disease consequent on the bite of a mad animal. Thus Van Swieten* relates that he attended a woman, who, as he says, had “a palsy of the muscles of deglutition, in whom the swallowing continued to be hindered in such a manner, that she could not get liquids down at all, but was only able to swallow large mouthfuls of solid food.” The same is further confirmed by this, that patients in this disease can frequently swallow liquids, but only when taken in large quantities at a time, or in successive draughts †, as by their bulk they prove superior to the spasmodic constriction which takes place from the irritation created by them. And although Sauvage’s ‡ patient could not swallow water, yet he could *broth*, which proved much less disagreeable to him, as it approached nearer to the nature of a solid, and consequently would act more by gravity in pressing down the epiglottis, and overcome the stricture raised by the irritation on the fauces.

* Comment. on Boerh aph. 818.

† Memoirs Lond. Med. Soc. vol. I. p. 249.

‡ Sauvage, Dissertat. sur la Rage, p. 12. Van Swieten, aph. 1158.

If this aversion from fluids depended on a power of irritation possessed by all kinds of liquids, as asserted by Dr. Heysham, then solids should never be refused, but swallowed with as much ease as in health. The contrary, however, is the case ; and I apprehend one great reason, why the notion has so universally prevailed of a specific dread of fluids being peculiar to the disease, is this : From the circumstance of the thirst, that distresses the patient, he is induced to ask for drink, which he finds it difficult and painful to swallow. Hunger, although it sometimes takes place, is by no means so uniform a concomitant of the disease as thirst, and it has seldom occurred to try whether the same difficulty prevailed equally with regard to both *solids* and *fluids*. In the few cases, however, where the experiment has been made, the same difficulty was experienced in swallowing *both* the former and the latter, and the convulsions have been equally excited by a mere sight of either.

Dr. Lister * relates, that his patient found great difficulty in swallowing food. The boy, whose case is recorded by Dr. Dickson †, declined eating some meat that was offered him, and when pressed, he begged that it might be cut small, in order that

* Philos. Transf. vol. III. p. 277.

† Lond. Med. Obs. and Inq. vol. III. p. 364.

he might have as little trouble as possible. Dr. Johnson* says, that any attempt to swallow some bread, occasioned the greatest agonies. Dr. Gray likewise takes notice, that after the disease had subsisted some days, his patient equally abhorred *solids* as well as *fluids*, and when importuned to eat, he was thrown into convulsions †.] Notwithstanding Mr. Babbington‡ mentions the dread the boy, whose history he records, had of fluids, he takes no notice of the least difficulty in swallowing solids; but our professor, Dr. Griffiths, informed me that he attended the hospital at the time the boy was there, and that the aversion from swallowing equally respected solids as well as fluids, and refused either to drink or eat; giving as a reason, that “it tore his stomach.” In the case recorded by Mr. Bathie, the patient objected to eating some food, saying, “its passage at the throat would be interrupted, as “had hitherto been the case with drink.”

After this discussion of the apparently simple question respecting the cause of the aversion from fluids, I expect no doubt will remain as to the propriety of referring it to the affection of the throat. I have shewn, that in those cases where this did not

* Memoirs Med. Soc. Lond. vol. I. p. 250.

† Edin. Med. Comment. vol. XI. p. 304.

‡ Med. Commun. vol. I. p. 215.

occur,

occur, fluids were swallowed with the same ease as in health, and also explained the reason why, for the most part, solids excite less pain. From the actual declaration of the patients themselves, it was likewise rendered clear, that there was no specific dread of fluids, but that the sole cause of the horror expressed at the sight of them, originated from their renewing the idea of their former pain. But lastly, the same aversion to fluids happening in other diseases where a similar spasmodic affection of the muscles of the throat, and a similar excessive sensibility, takes place, prove the falsity of the opinion, which supposes the aversion to depend on the poison.

There are several other symptoms of this disease which merit an explanation: but were I to attempt these, it would extend this dissertation beyond all bounds, and I must therefore decline their consideration, and proceed to the

DEFINITION.

I deferred this part of my subject until this place, because there were several circumstances required to be explained, before the definition could be given, and which tended to contradict the opinions of authors on which the definition of the disease was founded.

Dr.

Dr. Cullen defines the disease to consist in “a
 “disgust and dread of any fluid to be drunk, as ex-
 “citing a painful convulsion of the *pharynx* or gul-
 “let, for the most part from the bite of a mad ani-
 “mal*.” By this definition, the illustrious pro-
 fessor has constituted the aversion from fluids an es-
 sential symptom of the disease, and has supposed it
 to precede the affection of the throat: but I have
 shewn, that it is not a constant symptom of the
 disease, and that solids as well as fluids frequently
 are equally difficult to swallow. It has been also
 rendered clear, that this aversion from swallowing
 depends entirely upon the recollection of the diffi-
 culty and pain experienced in a former attempt.

Dr. Cullen likewise supposes the disease to arise
 spontaneously in some cases; which I have before
 rendered probable, never happens. I would there-
 fore say, that the disease of which we are treating,
 consisted in “violent convulsions of the whole
 “body, particularly the throat, creating a difficulty
 “of swallowing, proceeding from the bite of a
 “mad animal.”

The length of time that elapses between the in-
 fliction of the poison, and the appearance of the

* *Potionis cujuslibet, utpote convulsionem pharyngis dolentem
 cientis, fastidium et horror. Cul. Nosol. Method. genus lxiv.*

disease, is very various; I am by no means, however, disposed to give credit to stories related by various authors of years elapsing before the person became affected. Thus Morgagni* refers to the *Ephem. Naturæ Curios.* for a case where twenty years intervened between the bite and the appearance of the disease; and also to another author, who says forty years elapsed; but I think these authorities may justly be suspected. And even Van Swieten, who, on other occasions, appears to have been sufficiently ready to give credit to things related on slight authority, entirely rejects the above; and very properly mentions the necessity of avoiding to inculcate such stories, on account of the bad effect they might have on the minds of weak people†. But whatever doubt may be entertained of the credibility of the case referred to by Morgagni, “there
 “ can be none,” says Dr. Percival, “ of the case
 “ which the same author‡ relates, of a boy under
 “ his own inspection, in whom the symptoms came
 “ on five months after a bite§.” Dr. Vaughan|| has given us a case, where nine months elapsed between the bite and the commencement of the disease; and instances at nearly similar distances of time, are re-

* Letter 8, Art. 21.

† Comment. on Boerh. aph. 1137.

‡ Letter 8, Art. 22.

§ Percival's Essays, vol. II. p. 370.

|| Cases and Obs. on Hyd. p. 22.

lated by authors. Dr. Tilton has recorded a supposed case*, where nineteen years elapsed between the infliction of the bite and the attack of the disease. But I cannot think with that gentleman, that it proceeded from the poison having remained so long latent, without affecting the system. It is said that the wound would frequently break out, and discharge freely. Now we have no instance of the real disease, where the same circumstance is mentioned; even on the attack, although a pain is generally felt at the bitten part, yet it seldom happens that the wound breaks out afresh. If this case proceeded from the poison, it certainly would have operated on the system the first time of the wound's breaking out; which, moreover, was not the case in the present instance. Another reason for not supposing it to proceed from the poison, is, that there is no instance on record of a real case of the disease being cured by the same mode of treatment, viz. a large and copious bleeding, and other debilitating means; which, though constantly recommended by writers on the disease, yet they have adduced no proof of the efficacy of the treatment. It is true, this woman had a most violent dread of water; but this, as I have already proved, takes place in the hysteria, which disease, in fact, I imagine the one described by Dr. Tilton to be. In

* Med. Comment. vol. VI.

this disease the same morbid sensibility of the nerves of the whole body, and particularly the fauces, prevails, into which I have endeavoured in some measure to resolve the aversion from fluids. It is remarked also that this woman was of a very irritable habit, and such, we know, are most subject to hysteria. A very violent attack of this disease frequently borders on mania, and requires very copious blood-letting for its cure; and such indeed does the case related by Dr. Tilton appear to have been. The only case to be depended on of the greatest interval of time occurring, is that mentioned by Mr. Nourse, where nineteen months intervened between the bite and the appearance of the disease. On the contrary, the shortest space recorded, is that related by Dr. Gray, to have happened in the East Indies, where death followed the evening of the same day in which the bite was received. At different periods between these two last mentioned, the disease has frequently appeared; but the most common time may be included between three and six weeks.

Here it would be an useful inquiry, to investigate the cause of the variety in the time when disease occurs. This has been attempted by many authors; but, in my opinion, it has not as yet been accounted for in a satisfactory manner.

The following are the principal causes which have been assigned, as influencing the late or early attack.

1. The part of the body bitten.
2. The stage of the animal's disease, at the time of inflicting the bite.
3. The difference of the original virulence of the poison.
4. The quantity of it inserted into the wound.

To enter fully into a discussion of each of these assertions, although highly useful, would extend my dissertation to too great a length; I therefore shall be as brief as possible.

1. The part of the body bitten, is universally admitted by authors, as having a very considerable influence on the period of attack. From the erroneous idea entertained of the specific tendency of the virus, to unite with the salivary secretion, it was said, that the nearer to the head the bite was received, the sooner would the disease appear. But for this opinion there is not the least foundation. In repeated instances, where the bite has been received in the head and parts adjacent, and where consequently the poison might be supposed to have
a very

a very ready communication with the saliva, the disease has not appeared sooner than in other cases where the wound has been received in the most distant part of the body *.

2. The stage of the animal's disease, at the time of inflicting the bite.

From the virulence of the poison, which has hitherto been generally supposed proportional to the continuance of the disease in the animal, a bite received in the latter stage, has been imagined to be much more dangerous than one inflicted when the dog was not long mad. But experience has shewn that a bite received in the first stage, has proved equally and as suddenly fatal with one received after the disease had subsisted some time †.

3. The difference of the original activity of the virus is supported on hypothesis alone. We have no proof of this difference; and the idea is opposed

* Med. Commun. vol. I. p. 214.

Morgagni, Letter-viii. Art. 29.

Ibid. Letter viii. Art. 22.

Med. Obs. and Inq. vol. III. p. 359.

Memoirs Lond. Med. Soc. vol. I. p. 255.

† Hamilton's Remarks, p. 201.

Med. Commun. vol. I. p. 216.

Med. Comment. vol. XI. p. 304.

by the analogy of other contagions, particularly the small-pox * and venereal disease †, in which, it is well known, the kind of matter has no influence over the disease it produces.

I should imagine likewise, that as the disease cannot be excited, unless the poison has arrived at a certain degree of perfect formation; so, if this has taken place, I cannot see the propriety in supposing any additional activity, as all it can effect is to excite the disease: the proportional violence of the symptoms must then depend on the difference of constitution.

4. The quantity of the poison inserted in a wound is equally void of influence respecting the appearance of the disease. In many cases, the bite has been so trifling as scarcely to be noticed, which has produced the disease as soon, and certainly, as where it has been very extensive. It would be unnecessary to quote instances, as they may be found in every author.

Having, as I hope, shewn the fallacy of the many causes assigned by authors for the comparative, early, or late attack of the disease in

* Cullen's First Lines, vol. II. p. 140.

† Hunter's Treatise on the Ven. Disease, chap. I. sect. vi.

different persons, I shall now proceed to lay down that which appears to me to be the true cause of the variety.

This, in my opinion, depends on the influence of the greater or less sensibility of the system, as depending on

1. ORIGINAL CONFORMATION ; and,
2. CLIMATE.

1. When speaking of the action of the poison in the production of the disease, I shall shew that it first acts, for the most part, on the nerves of the place where it was inserted, and afterwards brings those of the whole system into sympathy. The influence of the greater or less sensibility of the nervous system will, therefore, be readily perceived to be considerable in favouring or retarding the appearance of the disease, inasmuch as it favours the increase of that morbid state, which I have already mentioned to be the peculiar property of the poison to induce. This has been found to be the case in the present instance ; for those persons, who either by habit, or other circumstances, were of an irritable nature, have been observed to be attacked much sooner than in those who possessed less sensibility of the nerves. Thus, in women and children, who, for the most part, have their nervous

systems

systems very easily moved, a much shorter period has intervened between the bite and the commencement of the symptoms, than in men, who, from possessing less delicacy or sensibility of their nerves, have remained longer free from the disease. Thus Sauvage * relates the case of a woman, in whom the disease came on in three days after the reception of the bite. In a boy †, a period of only seven days elapsed between the bite and the appearance of the symptoms: while a “ laborious farmer ‡,” who was bitten in September, felt no inconvenience until the June following.

This reasoning is confirmed by what we see respecting other nervous diseases, where a greater or less degree of sensibility has a most important influence in their production, by rendering the system more liable to the impression of stimuli. Thus, a sudden fright will throw some women into convulsions, while others will be not in the least affected by it, except a slight momentary agitation. The noise of a person chipping bricks §, or the sound of a bell ||, have occasioned fainting and convulsions. The Turks, from the immoderate use of

* Sauvage, sur la Rage, p. 4.

† Med. Commun. vol. I. p. 214.

‡ Vaughan's Cases, p. 22.

§ Kirkland's Inq. into present State of Med. Surg. vol. I. p. 199.

|| Boyle's Usef. of Experiment. Philosoph. part ii, p. 248.

opium,

opium, are affected with the greatest sensibility of system; and to such a degree does it prevail, that the slightest noise, such as the sudden shutting of a door, the falling of a sonorous body on the floor, will occasion involuntary startings and tremors, similar to what we observe in women who are highly hysterical *. On the contrary, “ when
 “ either the *whole* nerves, or a *part* of them, are de-
 “ prived of a proper degree of sensibility, the body
 “ in general will then be less apt to be affected by
 “ the above causes; and the action of those parts
 “ will be imperfect. Thus, when the nerves of
 “ the intestines are less disposed than usual to be
 “ affected by their natural *stimuli*, the irritation of
 “ the aliments, air, and bile, will be only able to
 “ raise a languid peristaltic motion, and therefore
 “ the person will be costive: when the sensibility
 “ of the retina is impaired, objects are seen less
 “ distinctly †.”

2. The second cause mentioned as favouring this early appearance of the disease, by producing a greater sensibility of body, was the *Influence of Climate*.

The effects of excessive heat, in producing a

* This fact I deliver on the respectable authority of Andrew Ross, M. D. of this city, who, from several years residence at Constantinople, had frequent opportunities of witnessing it.

† Whytt's Works, 4to. p. 527.

great degree of sensibility of body, and on the contrary; the tendency of cold to diminish it, are well known: hence in warm countries the greater frequency of nervous diseases, particularly Tetanus, which is accounted endemial to hot climates and seasons. In this city also, during the warm weather, it frequently appears; but the observation of physicians respecting the present disease, puts it beyond a doubt, that in warm climates the disease comes on much sooner after the infliction of the bite, than in those that are cold. In the East Indies, it is said to be in particular very rapid in its progress; and Dr. Gray * relates, on the authority of Mr. Murray, formerly an officer in the Nabob of Arcot's service, that when at Madras, he saw a boy brought into the fort, who died in the evening of a bite he received the same day.

SYMPTOMS IN DOGS.

IN order to dispel any fears, in case a bite should be received by a dog supposed to be mad, or to stimulate others to apply for early relief, it may be necessary briefly to mention the symptoms whereby a dog may be known to be affected. These, after the disease has subsisted for some time, must be evident to any one; but in its very commencement, it is an important consideration to be able to

* Med. Comment. vol. XI. p. 304.

ascertain the fact in a clear and decided manner ; as I have shewn that the poison, though contrary to the universal opinion of all writers, is equally capable of producing its fatal effects in the first attack of the disease, as in its latter stage.

1. A loathing of food, which is generally accounted by authors as a certain sign of the disease, is by no means worthy of being trusted to, as dogs in the first stage, after heartily eating, have given a bite, which has caused the disease. In the case of Admiral Rowley's son *, " the animal turned from its meat, and bit him on the right side of the lower lip." Mr. Bathie also tells us, " that the dog, far from exhibiting any appearance of madness, deceived the boy by fawning on him, and *without reluctance ate bread* which he threw down to him.†." Both these persons, however, were afterwards affected, and fell victims to the disease.

2. An aversion from water, though likewise usually mentioned as a symptom of the disease in these animals, does not always appear. Mr. Andrew Ellicot‡ informed me, that he saw a dog in the height of the disease swim across the river Petapsco, near Baltimore. Dr. Hamilton likewise mentions two

* Hamilton's Remarks, p. 202.

† Med. Comment. vol. III. p. 290.

‡ Geographer General to the United States.

instances, where dogs lapped water but a few hours before they died*.

The only symptoms in the case of Mr. Rowley's dog, as related by Dr. Hamilton, was, that he looked poor and thin: this, however, in my opinion, is not so certain a sign as those which occurred in the dog that bit Mr. Bathie's boy, viz. a dulness and inflammation in his eyes, and being avoided by the dogs that came near †. This instinctive principle of self-preservation, wisely implanted in those animals, is sufficient to distinguish the actual presence of the disease, although it may not appear by any symptom whatever.

In case, however, as it very frequently happens, that the dog which gave the bite is killed, and the unfortunate person wishes to know whether he was actually mad, we have an experiment related by Mr. Petit ‡, whereby our doubts may be fully ascertained. If a piece of meat be rubbed round the teeth and gums of a dog, that has been killed, and supposed to be infected, and given to another dog, he will eat it if the dog was free from infection, but reject it, if the disease existed in him. From

* Hamilton, p. 262.

† This observation, generally attributed to Dr. James, was mentioned by Palmarius, *de Morbo Canis rabidi*, lib. cap. i.

‡ Acad. des Sciences, 1723. p. 39.

the known fact of all dogs lying from an infected animal, I am disposed to think that Mr Petit's observation is well founded, and therefore in such a case of doubt, it certainly deserves a fair trial.

Too much, however, cannot be said against the practice of killing every dog supposed to be mad : Van Swieten * indeed strongly advises it, and common opinion appears fully to concur with him. But I agree with Dr. Hamilton † in reprobating a practice, by which the truth can never be ascertained, while the person may be daily under the apprehension of an impending terrible disease. On the contrary, the dog supposed to be mad, should not be suffered to be at large, but immediately confined. This caution is more absolutely necessary, if a bite has been received, as a patient will thereby be enabled to judge from the termination of the dog's disease, whether he labours under any risk, and the propriety of undergoing a troublesome treatment.

REMOTE CAUSES IN DOGS.

THE remote causes generally laid down by authors as producing a predisposition to this in dogs, and other brute animals, are;

I. GREAT HEAT, *or* COLD.

* Van Swieten Comment. aph. 1135.

† Hamilton's Remarks, p. 153.

II. PUTRID ALIMENT.

III. DEFICIENCY of WATER.

IV. WANT of PERSPIRATION.

V. WORM *under the* TONGUE.

I. Of all the remote causes enumerated, to none has more influence been attributed than *heat*; hence the disease is generally said to be most prevalent in warm countries: and Dr. Hilary says, “it is so frequently seen in the most hot countries, and especially in the West-Indies, that it may be said to be endemial*.” Dr. Mosely, however, in opposition to this asserts, that it is “so far from being true, that if Hilary, who treats of it, and relates several cases that were under his care, had not been a man of good character, I should have doubted whether he had ever seen a mad dog in the West-Indies. During my residence there, I never heard of the disease; and from the inquiries I have made I am certain that there has been no canine madness in many of the islands for fifty years before the year 1783†.” In other countries

* Diseases of Barbadoes, p. 245.

† Diseases of Tropical Climates, p. 32. Mr. Chamberlaine, Secretary to the Medical Society of London, informs the Editor, that in several letters of his correspondents in Jamaica, written in the years 1783 and 1784, mention is made of the alarm occasioned among the inhabitants by mad dogs; that many had run mad, and that canine madness had never been known in Jamaica until the above period.

equally

equally warm with the West-Indies, the disease has never been known. In South-America, Don Ulloa says, “the people there express their astonishment when an European relates the melancholy effects of it*.” The same fact is given on another authority†, and noticed by Van Swieten‡. Mr. Desportes§ also, who practised physic in Hispaniola, from 1732 to 1748, relates that the disease was a stranger there during that period. Mr. Volney|| likewise informs us, that in Egypt and Syria canine madness is unknown, and that Prosper Alpinus has also made the same remark in his treatise on the physic of the Egyptians.

Although the facts here stated may seem, at first view, to militate against the common idea of the influence of heat in the production of the disease; yet I apprehend that the circumstance of its not prevailing in the above places, may be fully explained, and will be found not in the least to detract from the general influence of the cause. To account, therefore, for the exemption of those countries above mentioned from the disease, I should imagine that there was, and may be, some local cause

* Ulloa's Voyage, vol. I. p. 296.

† Biblioth. Raisonné, 1750, Avril, May, Juin, p. 422.

‡ Van Swieten's Commentat. on Boerh. aphor. 1129.

§ Histoire de Malad. de St. Domingue. Mosely, p. 32.

|| Travels, vol. I. p. 149. Dub. 1791.

operating, tending to prevent the appearance of it, by counteracting the effects of the heat. Thus, though Desportes did not see it, yet it broke out in the Spring of 1783 in Hispaniola, and in the month of June in Jamaica, where it raged until March 1784. In other countries, also, the disease does not always prevail, although the heat of the weather be extreme, while at other times, under the same circumstances, it is universal. Thus although dogs do not go mad at present in Syria and Egypt; yet Mr. Volney tells us further, that the "name of the "malady is to be found in the Arabic language, "and is not borrowed from any foreign tongue;" which plainly shews that it was once known there. Dr. Mosely likewise informs us, that during the late war, in the West-Indies, "many dogs were "seized with the disease, which had no communication with each other; and some dogs that were "brought from Europe and North-America, and "that were not on shore, went mad on their arrival in the harbours of the islands*." I am therefore disposed to embrace Dr. Mosely's idea of the cause of the exemption of the above places, and with him think it is owing to some influence of the air†.

* Mosely, *Dis. of Trop. Climates*, p. 33.

† Mr. Chamberlaine informs the Editor, that hurricanes were formerly frequent in Jamaica; but for 50 years before the year 1780, they were not known. Since that year they happen almost every year, and do as much mischief, as in the Windward Islands.

But as I mentioned cold as a remote cause, this may also appear to oppose the opinion of the effects of heat, in producing the disease. It is actually admitted for this purpose by Dr. Heysham*. This, however, only proves that the same end can be produced, by two opposite causes. Heat and cold, when applied in a moderate degree, produce the most different effects; but are attended with the production of the same general debility when applied in a violent manner. This state I am disposed to believe, has a considerable share in exciting the disease in dogs, as I shall hereafter shew it has in men. The influence of excessive cold or heat as equally favouring the production of the disease was known at a very early period of time. *Ætius* informs us, that it was common in those countries where the violence of winter and summer was equally excessive†. During several hard winters within my remembrance in this city, dogs very commonly went mad. This was particularly the case in that of the year 1779-80, when more of those animals perished by the disease than for a long time before. Throughout Maryland, I am informed on very good authority, it was still more general. That dogs are capable of, and do actually

* *Dissert. de Rabie, cap. VI.*

† *Ætius, lib. VI. cap. 24.*

Van Swieten Aph. 1134.

labour under, *debility* in the beginning of this complaint, is fully proved by their being affected with the same symptoms, which so clearly characterise the existence of that state in men ; as aversion from motion, love of solitude, down-cast look, tendency to sleeping, &c.

Second. *Putrid aliment* is generally supposed to favour the production of the disease among brute animals, but this opinion is opposed both by Drs. Parry and Heysham, on the principle of hounds not being more liable to the disease, who are fed on carrion, than other animals *, and because such food is agreeable to them †. But, although I do not suppose, that a dog by feeding on such aliment alone, would become mad, yet I must deny the position of those gentlemen, when they assert that such dogs are not more liable to the disease than others ; for not only such aliment, but too high feeding also, favours the production of it. We had a remarkable proof of the influence of carrion eaten by dogs, in setting them mad some years since, in this city. At the conclusion of the late war, and before that period, all the horses and other animals that died in the city, were carried out to the com-

* Parry Dissert. inaug. de Rabie Contag. Ed'n. 1778. Websteri prax. Med. Syst. tom. II. p. 261.

† Heysham Dissert. inaug. de Rabie can. Edin. 1777. chap. VI.

mons, and suffered to putrify there ; and it is well known, that at this period, madness was a most common disease among the dogs, who used constantly to devour this carrion ; but of late it more rarely occurs among them, since the former practice is not any longer suffered.

Third. *A deficiency of water*, has also been universally accounted one of the most common causes of this disease. Hence it has been said to prevail most in dry seasons, and countries ; and so powerfully does the idea of its influence operate, that in some countries, it attracted the attention of government, and measures are accordingly taken to prevent the disease, by having the animals duly supplied with that article *. But there are some circumstances to prove that there is but little connection between the production of the disease and the deficiency of water. For in the island of Antigua, where there are no springs, but all the water used is brought from the neighbouring islands, or caught

* Dr. Mosely relates that in Venice they suppose it is often brought on by thirst ; for which reason, barbers, shoemakers, &c. have a small tub of water always before their doors, that the dogs running about the streets may drink when they want, as there are no places in that city where they can otherwise supply themselves with fresh water. *Diseases of Tropical Climates*, p. 33.

when the rain falls, Dr. Parry* asserts, on the authority of Dr. Samuel Athill of the above place, that the disease is unknown.

Fourth. *Awant of perspiration*, has likewise been one of the causes to which the most powerful influence has been attributed in the appearance of the disease among dogs, and other animals: "The rabies, or madness," says Dr. Mead, "in a dog, is the effect of a violent fever: no dog ever sweats; from whence it follows, that when his blood is in a ferment, it cannot, as in other creatures, discharge itself upon the surface of the body; and must, therefore, of necessity, throw out a great many saline and active particles upon those parts where there is the most constant and easy secretion; and such, next to the miliary in the skin in us, are the salival glands†."

I shall not stop to refute the erroneous opinions contained in this paragraph, as their fallacy will be readily seen, by any one acquainted with the improved state of physiology, at the present day, but will only observe, that the assertion of there being no perspiration in dogs is a mere hypothesis. The peculiar structure of their skin, together with the

* Dissertat. inaug. Edin. 1778.—Websteri prax. Med. Syst. vol. II. p. 261.

† Mead's works, p. 80.

circumstance of its being covered with dirt, or dust, prevents the appearance of actual sweat; yet that they do perspire, and in a copious manner, is fully proved by the strong smell that every one perceives on approaching them; and “by one of those animals being able to trace another by the scent of his footsteps, which could not happen if a large quantity of perspirable matter was not constantly going off*.”

I would also remark, that the salivary discharge, is the most unfit secretion, to furnish an outlet to fluids requiring to be evacuated. In man, the discharge which is vicarious to that of the skin, is by the kidneys, or bowels: hence the old adage, “*Cutis laxitas est alvi densitas;*” and it accordingly happens, that on the obstruction of the perspiration, either a *diarrhœa* follows, or copious discharge of urine; and *vice versa*, those who have a free flow of perspiration, have the secretion of urine diminished, and are habitually costive †;” but this is not ob-

* Note to Monro’s comparative anatomy, in the new system, vol. III, p. 347.

† The frequent inclination to, and discharge of urine in dogs, may also seem to favour the idea of the defect of perspiration in those animals, by which a greater flow is determined to the kidneys: but I hope I have fully proved that this position is groundless, and the cause of this frequent expulsion of urine is owing to the greater acrimony of the secretion, and more muscular make, and less capacity of their bladders, by which they are unable to retain the urine secreted, so long as other animals, whose bladders are of a more membranous structure, and of greater dimensions.

served in dogs. What reason, therefore, can be given for this variation in the performance of the same function in different animals? Do not similar laws govern the œconomy of all animated nature, under similar circumstances.

Fifth. The last cause mentioned of this disease, was *a worm under the tongue*. Pliny* was the first author who took notice of this. Various subsequent writers, and even at the present time, when ignorance and superstition are nearly banished from the science of medicine, and given way to truth and reason, there are not wanting some “who have paid it implicit obedience, and given to it a stupid belief†.” The idea of a worm is utterly false, as no such thing exists. Dr. Brodie‡ says he never could discover, on dissection, any worm: yet Dr. Heysham§, who furnishes me with this authority, admits the idea of this substance being a cause of the disease, and approves of the vulgar practice of extirpating it. Others, who deny the existence of this supposed worm, assert that it is a gland, and

* There is a worm in the tongue of dogs, says he, which is called by the Greeks *Lytta*; and this being taken out, when they are young whelps, they neither become mad, nor feel any sickness or loathing. Nat. Hist. lib. 29, cap. V.

† Hamilton’s remarks, p. 135.

‡ Dissert. inaug. p. 8.

§ Dissert. inaug. Edin. 1777, cap. VI.

secrets

secretes the venom which produces the disease: but no secretory duct has been seen, which being essential to the nature of a gland, this idea must then be equally futile; neither is it a nerve, as supposed by Dr. James, but a spiral substance between the nature of a *ligament* and *tendon*, as shewn by that excellent anatomist Morgagni*.

The nature of this substance being determined, let us examine into the actual merit of it, in the production of canine madness.

In the first place, Dr. James, who was one among the few opposed to the doctrine, asserts, that not the least security is afforded to any dog by the extirpation of this substance. The great experience of this gentleman in the diseases of the canine tribe is well known, being, as Dr. Hamilton says, “a professed dog doctor,” and his opinion, therefore, merits the utmost attention. “Dogs,” says he, “thus treated, run mad equally with those who have never suffered this absurd operation †.” Dr. Berkenhout likewise treats it with ridicule, as having no foundation in truth ‡. But Dr. Hamilton’s single testimony would alone have been sufficient to

* Letter VIII. art. 35.

† Treatise on canine madness, p. 204.

‡ Essay on the bite of a mad dog, quoted by Hamilton.

disprove

disprove the notion. He has fully shewn, from the testimony of a person of credit at Ipswich, who has wormed many hundred dogs, that it afforded no security.

REMOTE CAUSE IN MAN.

HAVING already, in the preceding pages, endeavoured to refute the common idea, of the spontaneous production of this disease in the human body, the only remote cause that I can allow is, *a poison of a peculiar nature in the saliva of a rabid animal, belonging to the genus canis.* A question here arises, which it is necessary to determine: In what manner, or by what means, is the virus, which produces this disease, communicated to the system?

The idea of the peculiar subtlety and penetrating activity of this poison, which has hitherto been generally entertained by physicians, has occasioned them to suppose many ways by which it was capable of entering the system. Some of these appear to be founded in imagination alone. There are other opinions, however, respecting the mode of introduction of the virus, which deserve some attention; but which likewise appear to be erroneous. These shall accordingly be noticed; and the action in the virus in the production of the disease finally pointed out.

I shall

I shall confine my observations to the following modes, by which, it is said, the poison can be received into the system.

I. *By* ABSORPTION.

II. *By the* BREATH *drawn into the* LUNGS.

III. *By* CONTACT *with the* SALIVA.

I. That the virus enters the system by absorption, and thus produces its specific effects, is an opinion which has been entertained long before the discovery of the lymphatics; and although, at first view, this may seem a probable way of accounting for the production of the disease, yet I apprehend, on a more minute investigation, the idea will be found totally void of foundation.

If an actual absorption of the virus took place, we should uniformly find, that it would stop at the first lymphatic gland, which was situated between the place of absorption and the common receptacle of the thoracic duct, and there cause a swelling and inflammation, similar to what is constantly observed to take place in the absorption of the poison producing the small-pox, venereal disease, or of pus of any kind. No such appearance, however, has ever been noticed by the writers of any of the cases on record. Dr. Hamilton*, indeed, speaking of

* Hamilton's Remarks, p. 13.

the pain felt in the course of the lymphatics, and in the axilla, or groin, of the inoculated arm or leg, observes, " the same may be said of the venereal disease; and the same remark has been noted in the absorption of the poison from rabid animals." But in all the histories which I have consulted, with a direct reference to this circumstance, I have never found it mentioned; and in the many cases which Dr. Hamilton has abridged from various authors, and subjoined to his treatise, this affection is not taken notice of in any one of them. This he certainly would not have omitted, had he met with it in a single case, inasmuch as it tended, in so decisive a manner, to have confirmed his assertion respecting the absorption of the poison. A pain in the bitten part, as I have frequently mentioned, is usually the first symptom of the general attack, but no pain in any of the lymphatic glands is ever noticed. Nay, Mr. Babington expressly observes, that the boy, whose case he relates, " complained of a pain in his right arm (the bitten part), which was attentively examined, but without any discovery of inflammation, or enlargement of the glands of the axilla." Dr. Vaughan* likewise observes, that " the progress of the virus, towards an admission into the system, cannot be discovered by diseased lym-

* Vaughan's Cases and Obs. p. 48.

“ phatics between the wound and the next conglomerate gland, or, what is more common, in the gland itself.”

But, granting that the virus is absorbed and carried into the circulation, yet still a difficulty remains in accounting for the symptoms of the disease: for if, like the contagion of the small-pox and venereal disease, the canine virus enters the circulation, it would affect the arterial system, and produce an inflammatory state of the whole body. The pulse would then become full and hard, the heat increased, and these symptoms would be accompanied by others, which are well known to occur in inflammatory diseases. None of these symptoms, however, are observed to appear in the present disease; and the histories of numerous cases inform us, that the pulse is weak, quick, and intermitting, and that a fever seldom or ever occurs*. The blood also, when drawn from persons labouring under the small-pox, or any other inflammatory disease, seldom fails to be covered with a *buffy* coat or *size*; but this has never appeared in any case of the present disease: for repeated observation

* Salus Diversus, de Feb. Pest. p. 58.

Sauvage, sur la Rage, p. 37.

Vaughan's Cases, p. 29.

has shewn, that it is no ways different from that drawn from a person in health *.

Independently of the want of similarity in the symptoms of the disease produced by the canine virus, with those which originate with an absorbed poison, the very great difference in the periods at which the present disease appears, militates strongly against the idea of absorption. In every case of the transmission of a poison into the system, through the medium of the lymphatics, the greatest uniformity is observed. The small-pox and venereal disease have each their particular and determinate periods of attack, from which they rarely depart in any climate, or constitution; but the canine poison is greatly influenced by both those circumstances, and has been known to infect, in all the intermediate periods, between the first day of a bite †, and nineteen months afterwards ‡.

If the absorption of the poison be rejected, the stories related by Palmarius, of the disease being communicated by kissing a patient ill with the disease, must be without foundation. Nay, Dr,

* Philosoph. Transact. vol. III. p. 276,

Ibid. vol. XLVII. p. 413.

Morgagni, letter viii. art. 30.

† Edinb. Med. Com. vol. XI. p. 304.

‡ Philosoph. Trans. No. 445.

Vaughan has proved, by actual experiment, the freedom from a morbid affection in the saliva of a human person. He inoculated a dog with some which was taken from a patient in this disease, but without producing any effect. He also says, that a nurse, who was constantly with the child, whose case he relates, often kissed it, and received its breath full in her face, without any bad consequences. A person also used to put his finger into the mouth of Dr. Munckley's * patient, in order to extract the viscid saliva, and felt no ill effect from the practice. But when we see that other poisons, whose absorption no one doubts, are not propagated by the blood or its secretions, as the small-pox and venereal disease †; which have never been communicated by inoculation with the blood, or any of its secretions, why should it be credited as occurring in this disease, where there are so many probable arguments against the absorption of the virus ‡?

2. As to the propagation of the disease by the air drawn into the lungs, nothing at first sight

* Med. Transf. vol. II. p. 46.

† Hunter's Treatise on the Ven. Disease, chap. i. sect. 1.

‡ This freedom from infection in the secretions extends also to brute animals. A whole family nigh Chester-town, Maryland, drank the milk of a cow, and the negroes on a farm ate the flesh of several hogs which died of this disease, without experiencing any inconvenience. Dr. Rush's Lectures.

seems more improbable. If it were possible for the poison to assume an aëriform state, of which, however, we have no proof, and be carried into the lungs, it would be expelled again in expiration; or if, by mixing with the saliva, it were conveyed into the stomach and bowels, its activity would be immediately destroyed by undergoing the digestive process. Other poisons, in a solid form, have been swallowed without any injury; as those of the venereal disease *, small-pox †, plague ‡, viper §, ticunas ||,

The supposition of the disease being produced by mere contact of the saliva, being founded on the idea of absorption, needs no particular refutation, as, I hope, I have proved that no absorption takes place.

It now becomes necessary for me to determine the mode of the introduction of the poison, and its manner of action on the system.

In the first place, I deem a wound absolutely necessary for its operation. From a consideration

* Hunter's Treatise on Ven. Dis. part vi. chap. i.

† Rush's Inquiries, append. p. 7.

‡ Philosoph. Trans. No. 37c.

§ Mead's Works, p. 37.

|| Bancroft's Hist. of Guiana, p. 300. Lond. 1769.

of the symptoms and nature of the disease, I am disposed to embrace the idea of the operation of the poison on the nerves, and think it can be better supported, than that of any other theory hitherto offered.

The poison, as existing in the saliva, when inserted by a wound into a part of the body, lies dormant for some time; and at length, in various periods in different persons, begins to shew its effects on the system at large. This opinion of the action of the poison on the nerves, is supported by the striking analogy subsisting between the present and other nervous diseases, particularly tetanus*.

1. In both tetanus and the disease consequent on the action of the canine virus, we may observe, that the same affection of the throat takes place,

* Morgagni seems to entertain the same idea with respect to the action of the poison on the nerves: he remarks, "from the progression of the pain upwards, and from what Salius observed it to terminate in, a certain confusion, unsteadiness, and weakness of mind, the virus does not seem to be carried through the veins (by which vessels, in his time, it was thought absorption was performed), but by the nerves up to their origins." Letter VIII. art. 32. Dr. Percival also ascribes the disease entirely to "nervous irritation." *Essays*, vol. ii. p. 369. And Dr. Vaughan says, "we must seek for the action of the poison solely in the nervous system." *Cases and Obs. on Hydroph.* p. 51.

and

and the same morbid sensibility over the whole body.

2. The pain at the pit of the stomach, and the rigidity of the muscles of the *abdomen*, which are such constant symptoms in tetanus, likewise occur in the present disease.

3. In both these complaints we may observe the same affection of the urinary organs, the same freedom from disease of the arterial system, and, lastly, the same tendency to putrefaction in the bodies of those who die of the disease. Morgagni* and Sauvage† make this remark on those who die from the bite of a rabid animal: and Dr. Rush mentioned in his lectures, a case communicated to him by Dr. Hahnbaum, of South Carolina, of a negro boy, who died of a tetanus becoming so putrid, that it was thought unsafe to open him a few hours after his death.

But the paralytic affections‡ and numbness§ which have seized the bitten limbs, and the dimness of sight||, and sometimes total blindness¶,

* Letter viii. art. xxiii.

† Nosolog. Method. vol. I. p. 354.

‡ Mead's Works, p. 661.

§ Med. Essays, Edinb. vol. V. part ii. p. 27.

|| Med. Commun. vol. I. p. 214.

¶ London Med. Enq. and Obs. vol. III. p. 368.

without

without any visible fault in the eyes, which are well-known symptoms of nervous diseases §, admit not the least room or suspicion for doubt, as to the action of the canine virus on the nerves.

It was asserted, that the poison remained long dormant in the part where it was first inserted, and afterwards brought the whole system into sympathy. This, I apprehend, can clearly be proved. We see the same thing every day in other cases where topical affections of nervous and other parts remain long without affecting the whole system, until the application of some cause renders them manifest.

Dr. Percival † relates the case of “ a lady, who
 “ had received a bruise on the *os sacrum*, by a fall
 “ when she was young: she soon recovered from
 “ its effects; but eighteen years afterwards the
 “ rheumatism fixed on the part, was attended with
 “ unusually excruciating pain, and long resisted the
 “ remedies commonly employed, with much more
 “ speedy success, in that disorder.” In a case of
 obstinate head-ach, on which Dr. Rush ‡ was consulted, it came on eighteen months after the stroke which caused it had been received; and my kins-

* Whytt's Works, 4to. p. 622.

† Percival's Essays, vol. II. p. 370.

‡ Rush's Lectures.

man, Dr. Andrew Mease, observed when the influenza prevailed in the place of his residence, "that affections of the abdominal viscera, which had long lain dormant, were resuscitated by the disease."* Cases of a similar nature, are frequently met with in practice, and in which there subsists a morbid local affection of certain parts, which are afterwards rendered manifest on the application of particular causes.

That the virus in the present disease, remains local in the part where it was first inserted, until the symptoms are produced, is confirmed by this fact, that persons have undergone general diseases, and the operation of general remedies subsequent to the bite; and yet the virus has afterwards shewn its effects on the system. Thus, there are repeated instances of persons having taken mercury as a preventive of the disease, and notwithstanding they had their systems fully impregnated with that mineral, have afterwards been seized with the disease †. Mr. Nourse ‡ also informs us, that he cut a boy for the stone, several months after receiving a

* Med. Commun. vol. I. p. 23.

† Med. Obs. and Enq. vol. V. appendix, p. 2.

Ibid, vol. III. p. 356.

Hamilton's remarks, p. 49.

Med. Comment. vol. III. p. 290.

‡ Philos. Transf. No. 445.

bite, and never saw a wound more disposed to heal than in that case : the boy was abroad in five weeks after the operation, and yet was afterwards affected by the disease. Van Swieten* also takes notice of the local nature of the virus, and says, “ it seems “ very surprising, that the most considerable changes “ that can be made in our humours, should be so “ often neither able to expel the infection, nor yet “ move it into action.” Those, also, who have the misfortune to be bitten, perform all their functions equally well, as when in the most perfect health ; until the poison comes into action : there can, therefore, be no doubt but that it remains in the part where it was originally inserted, until the application of some cause favours its producing the disease.

PROXIMATE CAUSE.

WHEN treating of the action of the poison, I asserted that its operation was on the nerves, and supported this opinion, by the consideration of the symptoms being similar to those which occur in other cases, where those organs of the body are the seat of diseases. I deferred speaking of the peculiar manner in which the virus produced its specific effects, until this place, and now propose to enquire in what manner, or by what operation on the

* Comment. on Boerh: aph. 1137.

nerves, the poison excites the symptoms of this disease?

To attempt to determine the principle communicated to the nerves, by which the poison produces this disease, would be impracticable; all that we know of it, is from its effects: I assert, then, that the virus induces a general debility of the nerves, and deprives them of their healthy tone, and the customary energy, which they had over the whole system.

But, it may be asked, in what manner does the poison act? Is it by a *direct* operation that it produces its effects? and on which the indications of cure are grounded: or, is it by *indirect* means, that it excites the disease?

Those who acknowledge themselves profelytes of the late Dr. Brown, will at once determine the canine virus to be endowed with a stimulating quality, as that author has all other poisons and contagions*; and if they agree with me in my proximate cause, will explain its mode of action, and the symptoms induced, on the principle of its producing that *debility*, depending on the application of *excessive stimulus*, and therefore denominated *indirect*; in

* Elements of Medicine, sect. XXI.

contra-distinction to that, proceeding from the *abstraction* of usual stimuli, termed *direct*. But, although I firmly assent to the idea of the stimulant action of those contagions and poisons which enter the system, in consequence of absorption by the lymphatics, as the small pox and venereal disease; yet as I have fully proved the impossibility of accounting for the symptoms of the present disease, on that principle, and cannot find the idea of the stimulant power of the poison, to be supported by the phenomena exhibited by the disease, I shall offer such arguments, as, in my opinion, tend to invalidate the general application of the assertion.

1. If the virus producing this disease acted as a stimulant, even granting that it induced indirect debility, it must be evident, on the same principle that accounts for this mode of action, that previously to the induction of this state, the virus must exert its stimulant effects on the system, which will be shown by the production of a general intermediate excitement. The symptoms consequently following, would be similar to those that accompany other diseases, where this preternatural excitement is observed to take place, and the functions of the nervous system would be performed with greater force and energy in consequence of the vigour induced in it by the stimulant operation of the virus. Thus, in maniacs, where from other causes than a
 2 poison,

poison, the nerves are under this preternatural tone, we observe a surprising increase of strength, great insensibility to cold, ferocity of disposition, and constant delirium: while, on the contrary, in the present disease, the most opposite set of symptoms are observed from the beginning; as great timidity*, extreme sensibility to cold, or the least variation in the temperature of the air, great languor and prostration of strength†, the paralytic affections‡, great difficulty of breathing, and a variety of other symptoms, which are well known to accompany diseases depending on a debility or relaxation of the nerves. If the poison acted by inducing indirect debility; during the state of excitement which must necessarily precede, debilitating remedies would be serviceable, and by pre-

* Hence patients in this disease were called pantaphobi.

† Dr. Mead has related the case of a man, who, in a convulsive paroxysm of his disease, broke all the cords with which he was bound to the bed; but this is the only instance to be found of such apparent strength taking place; and even if it were a constant symptom, the action of the poison in producing debility, would not be invalidated, as the same increase of strength is observed in hysterical, and epileptic girls, who although, when in health, are extremely weak, yet will require several strong men to hold them, when seized with an acute attack of those complaints.

‡ Mead's Works, p. 661.

Philosoph. Transf. vol. III. p. 280.

Med. Essays, Edinb. vol. V. part II. p. 27.

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venting the progress to indirect debility, should cure the disease. But bleeding, and other evacuating remedies, have been used in every period of the complaint, and melancholy experience proves the injury sustained by their use.

It is therefore by a direct debilitating operation on the nervous system, that I suppose the virus to act in producing the disease. I well know it contradicts the theory of the above mentioned author, in whose opinion, all things in nature are stimulant *; and who also asserts that those causes which are of a debilitating nature, do not possess any positive power, but become hurtful by possessing a less degree of stimulus than is necessary to support animal life. This opinion, however, to me appears very erroneous; for there are many things capable of acting as direct sedatives on the human body, which do not contain a particle of stimulus. Of the truth of this assertion, nitre is a very remarkable instance. The universal use of this medicine, and the benefit derived from it, in inflammatory diseases, is a full proof of its direct sedative properties. If it produced the least stimulant effect, however small this may be, it must add the *proportion of that stimulus to the system*, and consequently increase the inflammatory diathesis already existing.

* Element. Med. Sect. XXXI.

After taking frequent doses of this medicine, therefore, the disease, which it was intended to remove, would be increased. It should also prove useful by the same stimulant operation, in diseases of weakness, although only in a small degree; but the direct reverse of both these takes place, and from the moment it is taken into the stomach, and shews any operation, it does not increase the force or frequency of the pulse a single stroke, but produces a diminution of both. It creates, at the same time, a sense of coldness in the stomach; and if its use be long continued, these symptoms are succeeded by the total destruction of the tone and vigour of that essential organ to our existence.

There are many other medicines which appear to possess a direct sedative power on the system, and whose effects from their first operation are followed by debility, without the least stimulant effect whatever.

Exclusive of the arguments, in favour of the disease depending on a relaxation, or want of customary energy in the nerves, derived from a consideration of the symptoms; other proofs shall be adduced of the truth of the same opinion, which I shall refer to the following heads.

I. PREDISPOSING CAUSES.

II. ANALOGY *of the* DISEASE *with* TETANUS.

III. THE INJURY *of* DEBILITATING REMEDIES.

I. That

1. That the disease originates from a general relaxation of the nervous system, I conclude from its production being favoured, and its power increased, by the existence of debility, whether it be *natural*, and depends on peculiarity of organization, or *acquired* by the application of debilitating causes.

(1.) The original debility of constitution, has a very considerable share of the influence in the production of this disease. When speaking of the causes of the comparative early or late attack in different persons, I endeavoured to prove, that the variety in the time of the appearance of the symptoms was proportioned to the *sensibility* of the nerves. This also, in my opinion, is in a direct ratio to the debility that prevails in those organs of the body.

I do not mean by this assertion to favour the *universality* of Dr. Brown's idea respecting the *excitability* of the system being always proportioned to the *direct debility* existing, and *vice versâ*. For, although this principle is true when applied to the *nerves*, and receives full confirmation from tetanus and the present disease, yet I am far from thinking it a general rule, as the idea, in a great number of the diseases of the *arterial system*, is contradicted by experience. In *typhus*, where there is the greatest direct debility, a very powerful stimulus is required

to produce any sensible operation; while, on the contrary, a very slight stimulus will aggravate an inflammatory complaint*.

When I say, however, that the sensibility of the nerves is proportioned to their relaxation, or want of tone, I mean to confine myself to their natural state; for when they are morbidly affected, the experience of *tetanus* shews, that however sensible the superficies of the body may be to external stimuli, yet that it requires a very powerful internal stimulus to produce even a slight *impression*, and to counteract that, under which the nerves already labour.

This law of the system is so universal, that I scarcely know an exception to it. Women, and boys, both of whose constitutions are very generally much debilitated, and, as formerly remarked, have their nerves very easily excited, likewise are affected with this disease at a much earlier period than men, in whom, from their possessing a greater degree of strength, and less sensibility of nerves, the

* It may be said, in opposition to this doctrine, that in palsies, where there is great want of tone in the nerves, there is also a defect of sensibility. But I would observe, that besides the want of tone, or morbid state of the nerves, they are also deprived of some principle, on which their power of communicating sensation depends, and of which we are altogether ignorant.

poison requires a much longer time to come into action. Old people, also, whose nervous systems have lost their usual tone, possess a very great degree of sensibility, and are affected in a violent manner by certain stimuli, which in others, not so advanced in life, or in themselves some years before would have produced no operation whatever. Hence the reason, why a few glasses of wine will inebriate a man, in the decline of life, who previously to passing his *acme*, would have borne a bottle without intoxication.

(2.) The causes concerned in the production of *acquired* debility, may be divided into external and internal :

The external, are violent heat and cold ; the internal, are, 1. debility from previous disease ; and, 2. depressing passions of the mind.

I formerly treated of the effects of heat in the production of a general debility, and consequent proportional sensibility of body, and therefore nothing need be adduced on that subject. Indeed, the fact is so well known, that it only requires to be mentioned, in order to be at once assented to. I shall therefore proceed to treat of the effects of cold in producing this debility, which proves a predisposing cause to the disease.

Although the effects of *heat* and *cold* are known to be directly opposite when applied in a moderate degree, yet it is no less certain, that they are attended with similar consequences, and produce the same debility, when applied in an excessive degree. The operation of *cold*, however, in the production of a predisposition to this disease, only respects *brute* animals: for, the people who inhabit *cold* climates, by means of heated stove-rooms, the use of stimulating diet *, and of fur cloathing derived from the animals, with which Providence has kindly stocked their country, prevent the occurrence of that excessive debility which the cold has a constant tendency to produce, and which, without the above precautions, would inevitably ensue. The effect of this debility, however, is seen in other animals, which, from not being possessed of the necessary means to prevent the action of cold on their bodies, are as liable to the diseases as those of warm climates †. Proofs of the influence of excessive cold,

* Such as frozen fish, fried in rancid whale oil, in which the greatest part of the diet of Northern nations consists.

† Notwithstanding the means made use of by the inhabitants of Northern climates, to prevent the *violent* effects of cold, yet they are not sufficient entirely to prevent their occurrence in a certain degree. These appear in the smallness of the stature of both man and beast, and the astonishing slowness in the contraction of the heart, which does not produce more than half the number of pulsations, that are perceived in an inhabitant of a more temperate climate.

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in producing the disease among dogs, and other animals, having been formerly adduced, I shall proceed to treat of the *internal* causes concerned in the induction of the *acquired* debility mentioned, which was, first, by *Previous Disease*.

I have already, as I hope, proved, that a general debility of the nervous system, when not *morbidly affected*, is always accompanied with a proportional excitability, or disposition to be acted on by stimuli. It has also been frequently mentioned, that in this disease, this disposition or principle of the body occurs in a remarkable manner. It will readily appear, therefore, how the debility which succeeds diseases in general, should possess such a considerable influence, in favouring the appearance of the disease, as it has actually been found to have. This will be rendered still more apparent, when it is considered, that this debility, or relaxation, is universally of the nervous kind, and is also accompanied with the same morbid sensibility of the nerves. Hence the impressions from external objects, which in health would scarcely be noticed, produce the most disagreeable effects, as frequent startings, or slight convulsions.

Many cases might be adduced, where this debility which succeeds diseases, has proved a predisposing

posing cause to this and other nervous complaints ; but a few only shall be mentioned.

On the recovery from a severe illness, and after some slight irregularity of conduct, a tetanus has been frequently brought on, and in this case very commonly proved fatal. Of this Dr. Moseley * gives us a remarkable instance. Many women have dated the commencement of an involuntary disposition to faint, and an immediate attack of the hysteria, on the least sudden surprise, which has continued to afflict them the remainder of their lives ; to a fright received during their convalescence after some disease, or in the very excitable state succeeding parturition. A melancholy case of a fatal locked-jaw fell under my notice in this city, during the summer of 1787, in a lady, by being awakened out of her sleep by the sudden arrival of her husband in the night. She was naturally possessed of an uncommon sensibility of constitution, and had been affected with symptoms of the puerperal fever for two days before the occurrence of the unhappy accident.

How the general debility, which arises, from previous disease, should favour the appearance of the present complaint, will be understood, when it is

* Diseases of Tropical Climates, p. 485.

considered

considered, that the nerves are then more liable to be affected by the irritation of the virus ; which was prevented from coming into action before, by the healthy tone and vigour which they possessed. The celebrated Cocchi * informs us, that he knew many who underwent the small-pox subsequent to the reception of the bite of a mad dog, and died of its effects after their recovery from the former disease. The small-pox, it is well known, leaves the whole system in a very debilitated and relaxed state ; and in children, or those not arrived at maturity †, a variety of diseases, depending on that cause, frequently follow, especially scrophulous swellings of the lymphatic glands, &c.

2. The second of the internal causes mentioned as producing debility, was, depressing passions of the mind.

Such is the connexion subsisting between the *mind* and body, and the influence they mutually possess over each other, that they have been very aptly compared, by a facetious author ‡, to a coat and its lining ; if you rumple the one, you rumple the other. The history of medical cases likewise teaches

* Bagni di Pisa, p. 319. Van Swieten's Comment. aphor. 1137.

† These, it was remarked, are endowed naturally with a greater degree of sensibility than adults.

‡ Sterne.

us, that this observation is founded on experience. The reciprocal influence of these two component parts of our nature over each other is so very considerable, that a disease of the body is affected in a most astonishing manner by the state of the mind. The reverse of this remark is equally true. The plague affords a singular proof of the assertion. But, in no instance, is the remark more strikingly verified than in those diseases which have their seat in the nerves. The propagation of these, from the affections of the mind, is decisive in its authority, and tends also greatly to confirm the ideas advanced respecting the present disease. The case of the children in the poor-house at Haerlem, among whom the epilepsy spread, from a few others being admitted among them who were afflicted with that complaint, is well known. It yielded after some time to the great Boerhaave, by the judicious application of a remedy suited to operate on their minds, after the failure of a host of medicines prescribed by other physicians, and intended to act on their bodies. Dr. Whytt* also informs us, that frequently in the Edinburgh Infirmary, women have been seized with hysteric fits from seeing others attacked with them. In the complaint, which is more particularly the subject of this dissertation, the influence of the mind is no less remarkable.

* Whytt's Works, p. 481. 4to.

When formerly treating of the aversion from fluids, and the difficulty of swallowing them, I mentioned the power of the imagination in continuing that symptom; and the possibility of overcoming it, by an act of volition. It has likewise been found that those persons who, from a knowledge of the effects consequent on the bite of a mad animal, have continued the apprehensions respecting their safety, or have been afflicted with grief, from any cause, were much sooner affected than others, who, either from ignorance or inattention, have never suffered the circumstance of the bite to dwell on their minds. In some persons, however, it must be acknowledged, that the disease has appeared in a short period of time after the bite, and who were entirely unconcerned about it; but this has been, for the most part, in those cases where the sensibility of the system, either from age or *idiosyncrasy*, has been adequate to the production of the same effects, as the debilitating operation of other persons continually reflecting on the probability of their being afflicted with the disease. In the case of Dr. Munckley's * patient, the consequences of a second dread and fear, in bringing on the symptoms, were very obvious. From the time of his being bit, until the period of the attack, he was afflicted with the greatest solicitude, and constantly laboured under the utmost anxiety of mind respecting his situation. A day or

* Med. Transf. vol. II. p. 46.

two previously to the appearance of the disease, he was observed to be more than usually melancholy.

Morgagni* relates the history of an old man, who had no symptoms of the disease, although bitten four months before, until after receiving some very ill usage. The boy, whose history is recorded by Dr. Dickson, perceived no indisposition until he heard that a person in the neighbourhood, who had been bit by the same dog as himself, died that day. A still greater proof of the effects of fear in bringing on this disease, is derived from a knowledge of the fact, that an actual *dread of fluids*, and convulsions at the mere sight of them, have come on by the influence of fear alone, and where the poison was not in the least concerned. Dr. Percival † has given two remarkable cases where the operation of mental impression, from a bite being inflicted by a supposed mad dog, produced these symptoms: and an instance occurred in this city some years since, where the natural fears of a gentleman from receiving a bite were increased to such a degree, by the improper suggestions of his physician, that an *actual dread of water* took place, and continued for several days. Finding, however, that without the use of any remedy, his apprehensions were groundless, his

* Letter VIII. art. 27.

† Essays Med. Philosoph. and Experiment. vol. II. p. 368.

reason triumphed; and when he became convinced of his error, he laughed at his own credulity, and at the fright that was occasioned by the false prognostic of his physician.

“ From a careful perusal of Dr. Nugent’s case, it
 “ may be discovered, that imagination, and an ap-
 “ prehension of danger, formed the chief of the
 “ symptoms which the Doctor attributed to real hy-
 “ drophobia *.”

II. The second general argument adduced to prove that the disease, at present under consideration, depends on a debility of the nervous system, was its analogy with tetanus.

I take it for granted that none will doubt the *nervous* nature of tetanus; but it may appear necessary to prove that it also depends on debility, before I make use of its analogy with the present disease, in order to shew that the latter originates from the same cause. To attempt this, however, would be digressing too far from my subject. Indeed, it would be unnecessary; as it has already been so amply demonstrated by Dr. Rush †, who, both by reasoning

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and,

* Hamilton’s Remarks, p. 225.

† Vide Medical Inquiries and Observations, Philadelphia, 1789, p. 169. A clear and decided proof of the injurious treatment of the old practice, and the success of the tonic plan, may also

and, what is still more decisive, the success of the tonic plan of treatment, has rendered the matter beyond all doubt. I shall therefore proceed to make use of the supposition of tetanus depending on debility as an established truth.

In a former part of this dissertation, I noticed the similarity which prevailed between the symptoms of these diseases; and I shall now add a few, of many more particulars, in which they agree.

1. Both these diseases prevail for the most part in *warm climates* and *seasons*, and both are propagated in *different* periods of time, after the application of their *respective causes*, in proportion to the *greater* or *less* sensibility of the system.

2. Both are rendered more fatal by the use of debilitating remedies. From the erroneous ideas entertained respecting the pathology of these diseases, the spasmodic affections and convulsions observed to occur were attributed to an *excess* of

also be seen by referring to a case related by the late Dr. Hahnbaum, of Charleston, which, together with some remarks, I inserted in the American Museum for August 1791. For proof, and cases of the success of the tonic plan of treatment in this disease, I would also refer to Mem. Lond. Med. Soc. vol. II. p. 108, 114. Trans. Royal Acad. at Vienna, vol. I. in each of which several cases of the efficacy of this invigorating mode of treatment are given.

strength.

strength. The most powerful debilitating remedies were accordingly made use of for their removal. But, instead of this apparent strength being the consequence of *too much* vigour, it is actually the effect of a *deficiency* of strength. It is well known, that “ in the greatest debility, and even a short time before death, spasms and convulsions are wont to occur*.” Notwithstanding I am indebted to Dr. Boerhaave for this remark, the same author was led into an error by the apparent strength shewn by persons labouring under this disease, when he says, that it should be considered as “ *summe inflammatorius.*” These convulsions do not arise “ because the force of the muscles in *contracting* themselves is increased, but because the force of the antagonists is diminished †.” Hippocrates, likewise, very early has noticed the occurrence of convulsions after hæmorrhages, and their uniform fatality. Hoffman appears to have been of the same opinion, when he says, “ *atonia gignet spasmos.*” So far are these spasms and convulsions from depending on real excess of strength, that they are evidently morbid, and deserve as much to be accounted so, as the apparent debility which takes place in *pneumonia*, rheumatism, or other inflammatory complaints. In these, the patients can neither move hand nor foot;

* Boerh. Inst. sect. 401.

† Morgagni, Letter X. art. 20.

and, forming our judgment from fallacious appearances, bark and wine might with the same propriety be prescribed to remove this debility as bleeding and other evacuations to cure the apparent strength in the former diseases.

But that the spasms and convulsions in tetanus depend on debility, requires no other proof, than the *death* and *destruction* which have in every case followed the *sedative* mode of treatment, and the speedy return to health by the use of tonic or invigorating remedies*.

From this view of the analogy subsisting between tetanus and the disease produced by the action of the canine virus on the system, it must appear, that although they are essentially different in their *remote*, they are very nearly related to each other in their *proximate*, cause. No doubt, the presence of the virus in the one case, is the cause of the greater per-

* Although the injury of bleeding in the disease arising from the action of the canine virus has been shewn by its uniform failure, yet the other part of the argument cannot be made use of to prove still further, that *debility* is its cause. I apprehend, however, that no other proof would be required; notwithstanding no case can be produced of the success of tonics in the *cure* of the disease, yet the probability of their utility will scarce be questioned after the fatality which has been shewn to attend an opposite mode of treatment, and their success in tetanus, whose affinity with the present disease I have already pointed out.

manency of the symptoms in the disease produced by it, and may occasion some peculiarity in the appearances, in addition to those which take place in tetanus. This, however, only shews that the *same effect* can be produced by *two different causes*; a circumstance which very frequently takes place in other operations of nature. No alteration, therefore, in the treatment of the disease depending on the canine virus, is necessary from that which has been proved to be so successful in tetanus. The history of other poisons also shew that the same state can be produced by two different causes, and yet the same remedies have been found necessary. Thus, in those eruptive diseases, whose remote causes are certain specific contagions, an inflammatory *diathesis* is as certainly induced, as by exposure of the body to alterations of heat and cold. The small-pox and measles afford a striking proof of this assertion. In these diseases, no particular complexion in the treatment is derived from the presence of the contagion, different from the *synocha*, or simple inflammatory fever: why, then, should the remedies of the disease produced by the canine virus vary from those used in tetanus?

The only difference subsisting between the *two* diseases, originating from contagion and the other simple affections, is, that in the case of the *small-pox*, a *less* degree of the same inflammatory state is induced

duced than that which occurs in *synocha* ; while in the disease produced by the *canine virus*, the same state which occurs in *tetanus* is also brought on, but in a *greater* degree. In the *small-pox*, therefore, a *less* use is required of the same *antiphlogistic* means which are proper in the *simple* inflammatory fever ; in the disease depending on the *canine virus*, a *more vigorous* and extensive exhibition is required of the *same* remedies which are used in *tetanus*.

III. The third and last argument advanced to prove that the disease depends on debility, was the injury of debilitating remedies. I have anticipated myself, however, on this head, by proving the truth of the assertion, when treating on the analogy of the present disease with *tetanus*. I shall, therefore, defer speaking any thing further on the subject at this time, especially as I shall have occasion to prove the fatality attending their use, when I come to treat of the remedies hitherto used for the cure of the disease.

METHOD OF CURE.

To establish a general system for the cure of this disease, two indications are immediately pointed out.

1. To prevent the poison from being communicated to the system.

2. To

2. To counteract, or overcome its effects, after they have begun to appear:

In order to answer the first indication, there have been a variety of external remedies made use of. The first to be mentioned is the excision of the bitten part. Where the wound appears to be so situated, that the part in which the bite was inflicted, can with propriety be cut out, every one will allow, that this operation must afford the greatest security: it ought therefore always to be preferred. But there are many circumstances which may concur to prevent its accomplishment. The wound is often inflicted deep in a muscular part, where the excision of so much flesh would be attended with great inconvenience.—“ Much time may be lost before the surgeon arrives; the sufferer may long resist all solicitations to submit to the knife; the wound may have been inflicted on the face, or near some large blood vessel; or there may be so little probability of the madness of the dog, as to render it unjustifiable to subject the patient to present pain, or future deformity *.” To the application of the cautery there are still more valid objections. The intensity of the pain attending the operation would be such, as to prevent numbers from submitting to it; and the idea of this would operate so

* Percival's Essays, vol. II. p. 375.

forcibly with many, that they would rather take the chance of escaping the disease, than suffer the protracted tortures of a hot iron. The idea of subsequent deformity, also, would operate powerfully, and this alone would be an insuperable bar to its employment.

The application of the *caustic*, as advised by many late writers, has failed in cases where it had unequivocally the fairest trial, and therefore does not seem intitled to our faith. In the case of Admiral Rowley's son*, to which I have had frequent occasion to refer in the course of this dissertation, the *caustic* was applied to the part immediately after the bite, and by the hand of the very judicious Mr Hunter; the disease nevertheless came on, and, as usual, proved fatal.

Various other applications to the bitten part have been recommended. It may not, therefore, be amiss to take notice of a few of the most noted, as it will serve to reconcile the prejudices in favour of particular remedies, and excite persons to the use of others, when that which they most approve may not be near at hand at the time it is required. The mercurial ointment is recommended by many, particularly Sauvage †. Red precipitate and subli-

* Hamilton's Remarks, p. 221.

† Sauvage Nosolog. Method. tom. II. p. 236.

mate has also been used *. Common salt has long since been highly commended, and additional proofs of its efficacy, have within a short time been presented to the public by Dr. Gale of Connecticut †. The solution of the common caustic in water, has likewise been greatly extolled. To determine the superiority of these applications, would be impossible, as it must be evident they all act on the same principle, by raising an inflammation and suppuration in the wound, and by preventing it from healing, cause a discharge of the virus with the pus from the bitten part.

There is also another application yet to be noticed which is intended to create a discharge, but not by an inflammation, unless long continued: this is the use of a long continued stream of cold water, poured on the wound, from a considerable height, from the mouth of a tea-kettle. This plan was first proposed by the benevolent Dr. Haygarth ‡, of Chester, in England, and is strongly recommended by Dr. Percival §; it has likewise received the sanction of the late Dr. John Morgan, the honourable Arthur Lee, Esq. and Dr. Samuel L. Mitchel, who separately published recommenda-

* Palmanus de Morb. Contag. p. 272.

† Newhaven, Connecticut, Med. Soc. Transf.

‡ See Appendix. Editor.

§ Percival's Essays, vol. II. 372—3.

tions of the practice in all the newspapers of this country. I am disposed likewise to entertain the most sanguine hopes from a proper use of this simple application, as none of the arguments mentioned against the use of the former applications can be applied to this; no situation of the wound or part of the body on which it is inflicted, can be urged as a reason for its omission. The poison also, we know exists in a *watery form*, and therefore, we should reasonably expect that water would be its most proper solvent. "The preference given to
 "cold water for the first ablution is judicious,
 "and accords with the idea above advanced, that
 "the nerves are the parts alone injured by the ca-
 "nine *virus*. They may thus perhaps be rendered
 "torpid, and the virus may be greatly diluted, or
 "washed away, before they recover such sensibility
 "as to be capable of suffering from its action.
 "When this has been sufficiently applied, warm
 "water should be used, not only as a better solvent,
 "but to produce a flow of blood; which coming
 "from numberless small vessels, may tend to com-
 "plete the cleansing of the wound*." If the
 wound received be but small, and there remains any
 doubt respecting the possibility of the water coming
 sufficiently to all parts of it, a slight enlargement of
 it with a scalpel, or lancet, will prove useful, and

* Percival's Essays, vol. II. p. 372.

this can be so done, as not to create deformity; the wound also might be suffered to bleed, and a continued use of the water would then afford perfect security from the disease.

The wound, however, ought by no means to be suffered to be healed suddenly, but should be kept open for some time as the surest means of preventing the constitutional affection. For it has been remarked that persons bitten by dogs, or other mad animals, who have had their wounds kept open, either by design or accident, remained free from the disease; while others, whose wounds have healed, became affected with it.

A remarkable instance of this, is related by Galen*. Two men were bitten by the same dog; one recovered, in consequence of his wound being prevented from healing; the other from not taking this precaution, and suffering the wound to close, died of the disease. The cases recorded by Dr. Fothergill, afford a striking proof of the same observation: Mr. Bellamy was bitten by the same cat as his servant maid; the wound of the former closed in a short time; but that of the latter not only continued open, but baffled the skill of a surgeon, to

* Galen de Sectis, tom. II, p. 293.

Van Swieten Com aph. 1143.

whom

whom she applied to have it healed *. Mr. Bellamy was attacked with the disease, and died of it, but the girl remained well.

Even in case the wound should heal, and several weeks elapse before any remedy had been made use of, I am of opinion, that it should be opened, and prevented from closing, as we know it takes very different times for the poison to shew its effects in different constitutions, and therefore the probability will be in favour of the person escaping the disease from this treatment.

Many general remedies, intended to prevent the disease, have been recommended ; but they “ rather “ serve to shew the credulity of their authors, than “ to furnish us with proper means of combating “ the dreadful consequences which follow †” the action of the canine virus on the system. The use of the cold bath has been extolled from the earliest ages, but there is no case that can be depended on where it prevented the disease, and there are an hundred that can be produced to the contrary. The Tonquin remedy has been equally unsuccessful. Master Rowley was attacked with the disease, during the use of it ; and our books of medicine

* Fothergill's Works, p. 353.

† Vaughan's Cases and Obs. p. 4c.

abound with many other instances of its failure. Near fifty years experience has proved, that the *lichen cinereus terrestris* of Dr. Mead, is totally useless: it is nevertheless absurdly retained at this day in some European pharmacopœias.

Another remedy more deserving of a particular attention on account of the praises which have been bestowed on it, for its supposed success, in preventing the disease, is the *Ormskirk* medicine. But notwithstanding the eulogium pronounced on it by Dr. Heysham, I cannot help ranking it with the many others by which the public have been duped. Repeated experience has shewn that it is equally inert with any that has been mentioned. I have no doubt, however, that the credit which this as well as many other remedies have obtained, was founded on the supposed experience of their success, from persons taking the medicine, and who have remained free from the disease. But this freedom from infection is not owing to any virtue in the medicine taken, but to other circumstances.

One great cause of the celebrity of the *Ormskirk*, and many other remedies, has been the circumstance of not one dog in an hundred being actually mad, from which a bite is received. These animals, impelled by the principle of self-preservation, are frequently obliged to commit this violence
by

by making use of the only means of defence with which Providence has furnished them, when attacked on all sides by an ignorant rabble, who are more mad than the dog they pursue. Dogs may, indeed, especially in summer, have some of the symptoms of canine madness, as frothing at the mouth, panting, lolling out the tongue; but these may arise from their violent exercise, in pursuing their lost masters, or, in returning home from a journey.

Hundreds of persons, after receiving bites from dogs in such a situation, have taken the Ormskirk medicine, and a variety of others, and by remaining free from disease, have supposed it to be owing to the medicine, when they would have been equally secure without them.

But exclusive of the fallacy of the experience, with respect to the supposed efficacy of this medicine, drawn from such cases as the above, there is another consideration which helps to account for the exemption of persons from the disease after taking it, and clearly shews the impropriety of ascribing it to that vaunted nostrum: for however fatal the effects of the poison have hitherto been, when these have occurred, it fortunately happens, that by far the greatest number of those who are bitten by dogs or other animals actually mad, are
never

never seized with the disease. This observation has been frequently made, and admits of no suspicion as to its accuracy. Thus Cocchi* relates, that among several persons bitten at the same time, and by the same dog, some died, notwithstanding the most noted methods of cure had been used; and that others again remained perfectly well, although they underwent no manner of treatment. Dr. Vaughan informs us†, that, “ of between twenty
 “ and thirty persons, who were bitten by the dog
 “ which gave the fatal wound to the boy whose
 “ case he records, not one felt the least ill effect but
 “ himself.” “ I know,” says Mr. Hunter ‡, “ where
 “ there were twenty-one people bitten by one dog,
 “ nothing was done for any of them, and only one
 “ was taken ill: if they had all taken medicine,
 “ then it would have been said, that they only lost
 “ *one* out of *twenty-one*.” In a letter formerly referred to, and published by Dr. Houlston §, it is said, that out of *nine* persons bitten by the same dog, only *one* was taken ill. If all the persons in the above cases had taken any medicines, the most unequivocal proofs would have been thought to have been exhibited of their efficacy.

* Bagni di Pisa, p. 318.

Van Swieten Comment. aph. 1137.

† Vaughan's Cases and Obs. p. 56.

‡ Letter to Dr. Hamilton—remarks, p. 213.

§ Lond. Med. Journ. Vol. V.

These facts, while they serve to shew in a decided manner, the fallacy of the experience respecting the supposed efficacy of preventive remedies, at the same time afford the most comfortable hope to those who may have the misfortune to be bitten by a mad animal.

Mercury, though it has been said to have had a fair trial, in my opinion, has never been properly exhibited. After a few days or weeks use, it has been omitted, and from the disease appearing afterwards an unfavourable opinion was formed of it. If the use of the mercury could be continued long enough, and until the period of the commencement of the action of the poison, I have no doubt but it would prove successful. But the distance of time between the infliction of the bite and the attack, has been shewn to be very different, and it is impossible to tell how long it may be necessary to give it; its use, therefore, as a preventive, ought certainly to be laid aside.

The method I would recommend, therefore, in case the bitten part is healed, and no application has been made, is the following :

After applying a caustic to the wound, it ought to be prevented from healing; whereby the poison will be evacuated; for until the time of its action, there

there is great reason to suppose that it lies in the part where it was originally inserted. The use of bark ought then to be begun, and continued, until the common period has passed, at which the symptoms generally commence. Preparations of iron, and particularly the prepared steel, may be advantageously joined to the bark. By the use of these medicines, such a degree of vigour will be given to the system, as will prevent the action of the virus from taking place; or, if this should actually come on, it must be evident that they will be slight, and consequently greater hopes may be entertained, that the disease will be overcome, than if the system was not under the operation of so powerful a tonic.

Having thus treated of the various preventive means hitherto recommended by physicians for this disease, I shall now proceed to the second indication pointed out, viz. to counteract or overcome the effects of the poison when they have began to be exerted on the system. On a consideration of the means advised heretofore, and actually put into execution, it will be found that they are equally useless with those that I have just been considering as advised for its prevention. From the erroneous ideas entertained concerning the cause of the convulsions which occur in this disease, and the apparent strength exhibited by those labouring under it, Boerhave,

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and

and others, as formerly observed, have considered it as highly inflammatory; and of course ordered copious bleeding, smart purging, and the whole of the antiphlogistic process to be strictly observed. The uniform practice of physicians, has been agreeable to that absurd theory. So far has the idea of the inflammatory nature of this disease carried authors, that bleeding has been directed to be performed, not with a sparing hand, but again and again, even unto fainting. Although the *uniform* failure of the remedy, and the constant subsequent increase of the spasms, and diminution of the pulse pointed out the absurdity of the practice, yet the continuance of the symptoms was not attributed to the mode of treatment, but to the obstinacy of the disease.

“ How far bleeding is indicated, Dr. Hamilton*
 “ remarks, I dare not yet venture to say. Dr. For-
 “ thergill, and other eminent practitioners, used it
 “ with freedom. It is also powerfully antispasmo-
 “ dic; but it is at the same time powerfully debili-
 “ tating. Here, then, seems to be as much against
 “ it as for it: and the pro and con are so equally
 “ poised, that we are at some loss which side to
 “ espouse.” Without further reasoning, I would
 observe, that my opposition to the remedy is

* Hamilton's remarks, p. 117.

founded on its *want of success*. Let this be candidly examined, and then see on which side the scale will turn. Dr. Fothergill, it is true, and almost all other practitioners, have employed it largely; but with *what success*? Have they cured the disease? The numerous cases recorded cry out, *No*. *Death and destruction* have followed as *surely* and *invariably* in every case where it was employed, as from a stab in the heart with a small sword. I defy a single instance of the real disease to be produced, where either a symptom was relieved, or a cure effected by it. Cases are indeed related by several authors, where it was used with *other remedies*, and the patient has recovered. But when a number of means are employed, is it rational to ascribe the success derived from their use to any *one*; especially when the operation of them is directly opposed to each other, as in the present instance? Thus bleeding, musk, opium, the warm bath, and sometimes mercury, have all been employed in the treatment of the same case.

But let the circumstances of these supposed successful cases be examined. The first is that related by Dr. Nugent; he used the three first remedies: but I have before rendered it probable, that this case was the effect of an hysterical paroxysm. Dr. Tilton's supposed case of this disease, which was also cured by very copious bleeding, was
shown

shewn to be a violent hysteria bordering on mania. Mr. Wrightson* also mentions a successful termination of a supposed case of this disease, by the use of the same remedies. But I am of opinion with Dr. Hamilton, that this was only a temporary phrenzy, brought on, as in the former case, by the effects of fear; for two reasons—first, because it came on in three days after the bite, which is a much earlier period than usually happens; and secondly, because it terminated favourably after the use of the remedies which have failed in every case of the actual disease,

Another means more frequently employed of late in this disease, is the *warm bath*. From this, in a few cases, benefit appears to have been derived while the patient was in the bath; but it was only a temporary alleviation; for it has been remarked, that whenever the water was the least ruffled, so as to touch a fresh surface †, the convulsions were again excited; by rendering the body also more irritable to the external air, it has finally increased the disease, by adding to a symptom the most dis-

* Med. Transf. vol. ii.

† Vaughan's Cases and Obs. p. 33.

The warm bath, though generally used in tetanus also, has been attended with no better success than in the present disease. Dr. Cullen says, it has even occasioned death in some cases. First lines, vol. III. p. 304.

treffing

treffing that occurs in the complaint. For these reasons, in my opinion, the warm bath ought never to be used.

I have thus taken notice of the various preventive and curative means hitherto repeatedly tried in this disease, and have found, that the *further* use of *none* of these is warranted by any good effect derived from them; it becomes necessary, therefore, that I should point out the mode I would recommend in the treatment of the complaint, as any endeavours to destroy confidence, without giving grounds for fresh hopes, would be attended with little benefit to society. The establishment, then, of a mode of cure will be very readily done, if it can be granted that the effect of the remote cause is the production of the proximate. I have already shewn that the *only* remote cause of this disease is the *poison*; and that this acts on the *nerves* by a *debilitating* operation, whereby they are deprived of their healthy vigour and tone.

I supported this opinion by proving—that the pre-disposing causes of the disease were of a *highly debilitating nature*—by its analogy with *other diseases*, acknowledged to depend on the *same cause*, to which the *present* was referred—and lastly, proceeding according to the strictest laws of philosophical induction, the truth of the opinion was established from

from the *injury of debilitating* remedies. I dwell on the *similarity* of the *present* disease with *tetanus*; and the analogy then mentioned is further strengthened by the fact, that *both* are prevented by the *same* remedies.

When a puncture from a nail, or a wound in a nervous part, is received, a *locked jaw* and a general irritation of the nerves are prevented from taking place, by the *local irritation* of the nerves of the wounded part, and the tone given to them by stimulating applications. In the case of the bite of a mad animal, the *same local* applications also prevent the *general* effects of the *canine virus*, by inducing its discharge from the system. In both these cases, therefore, we see that the same remedies eventually obviate the occurrence of the *same proximate* cause, though on different principles with regard to the *remote**.

Our

* The effect of an irritation raised in *one* part of the body removing that which already exists in *another* part, admits of very extensive application in medicine. This principle, which was first discovered by Mr. John Hunter, is frequently verified in the cure of diseases. A violent hiccoughing, which is known to arise from the contraction of the diaphragm, has yielded to the application of *vol. alkal.* to the nose. The stimulus arising from a pair of blisters to the thighs has restrained a vomiting in the bilious fever, which had resisted for two days all the remedies commonly employed with success in that case. Of this I have related

Our views, then, in the cure of the constitutional disease, should be,

1. To diminish the morbid sensibility of the system; and,
2. To restore that degree of vigour which it had lost in consequence of the action of the poison on it.

The propriety of the first indication will be very readily perceived, when it is considered, that the effects of the poison on the system are to induce in it a morbid sensibility, and that the violence of the disease will be just in proportion to the degree of that existing. Whatever, therefore, will have a tendency to diminish this sensibility, or render the system less susceptible of the irritation of the poison, must be of very great importance in the cure.

On the first attack, therefore, of the disease, such medicines as are known to possess this property of diminishing sensibility should be freely given: of

related a remarkable instance, in the American Museum, for Oct. 1790, in the observations on the weather and diseases of this city, which I published, monthly, in that work, during the above and succeeding years. The utility of the application was first pointed out by Dr. Quier, of Jamaica, in his treatise on the bilious fever of the West-Indies.

these opium is the most proper. But, from the violent irritation under which the nerves labour, the usual effects of the opium are not produced, unless taken in large quantities. For this reason, the first dose ought to consist of several grains, that a check may be at once given to the symptoms; and, in order to derive any further benefit from its use, it should be gradually encreased to ten or fifteen grains, and occasionally repeated in double that quantity in the course of the disease, as often as a former dose has ceased to produce its effects on the system*.

Opium, though it has been trusted to alone for the cure of this disease, yet experience proves that it is only equal to the palliation of the symptoms, of which advantage is to be taken by the exhibition

* The quantity of opium that a person in this disease can take with scarce any effect is really astonishing. Dr. Vaughan relates, that he gave 57 grains in the course of 14 hours, with scarce any advantage. The same observation is applicable to the tetanus, in which disease fifteen hundred grains, or three ounces and a drachm, were given in one case, in the course of 17 days, in the island of Antigua, with success. Amer. Phi'os. Trans. vol. i. p. 315. In the Mem. Lond. Med. Soc. vol. ii. there is also a case related, where several hundred drops of laudanum were taken in the course of 24 hours, combined with antimonial wine, which cured a spasmodic affection proceeding from the puncture of a hair-pin in the thumb. In one day, particularly, near a thousand drops were taken.

hibition of other remedies. Injected in a liquid form into the bowels, it may exert its good effects on the alimentary canal, and the whole system in general, when it cannot, from the difficulty of swallowing, be taken by the mouth.

As a means of diminishing the morbid sensibility of the system, especially of the surface, frictions of the body with *oil* appear to promise much benefit. Celsus*, and other ancient authors†, mention the practice of immersing patients in a *bath* of oil in this disease, with a view of allaying the spasms; but it has long been neglected. Dr. Sims, of London, however, we have been lately informed, has renewed the practice; and by bathing the whole body of a patient in this disease for three days with oil, and also by a liberal use of it internally, it is said, effected a cure§. I very readily subscribe to the promised utility of the practice, both from reflecting on the probable effects to be derived from it, and also from the very remarkable benefit that has attended its use in other spasmodic diseases and affections. In the tetanus, whose great similarity with the present disease has been frequently mentioned, Dr. Blane‡ informs us, on the authority of Dr. Warren, “that the uneasiness arising from the

* Celsus, lib. X. chap. II.

† Arteus Cappadox de Curat. Morb. chap. VI.

‡ Diseases of Seamen, p. 491.

§ Related in the Appendix, by Dr. Shadwell. Ed.

"Spasms was allayed by drawing a feather wetted
 "with oil over the temples." Morgagni * relates a
 case from another author, where a bath of warm
 oil had an evident good effect in quieting convul-
 sions that proceeded from the vapours of a mineral
 poison. Every consideration argues much in its fa-
 vour, and therefore further trials deserve to be made
 of it: additional efficacy will be derived by the oil
 being warm, as it will become more agreeable,
 in allaying the extreme sensibility of the nerves on
 the superficies, which is one of the most trouble-
 some and distressing symptoms attending the disease.
 The COLD BATH, though hitherto unsuccessful in
 the cure of the disease, I am disposed to think, if
 properly managed, might be used also with advan-
 tage. Instead of half drowning the patient by a
 forcible immersion, as generally advised, the water
 should be employed by way of *affusion*, and frictions
 made use of afterwards. The horror of water is
 no objection, as the same takes place in tetanus, and
 from the cure of that disorder by the cold bath, I
 am inclined to think benefit would be derived from
 it in the present disease.

2. To restore the tone of the system, which it
 had lost in consequence of the action of the poison
 on it, the various medicines, called stimulants and
 tonics, must be used.

* Letter X. art. 21.

In the commencement of the disease, when the power of swallowing may be as yet free, the bark should be exhibited in as great a quantity as the stomach can bear. One or two drachms may be given in the course of an hour in wine, until they begin to lose their effects on the system, when recourse should be had to some means to render them still more powerful; the wine, therefore, may be given hot. After the bark and wine have ceased to operate, they may be alternated with other powerful medicines of the same class. A constant state of excitement may by these means be kept up, and the bad effects arising from the system's sinking, from the omission of any, be avoided. In this manner, therefore, the whole class of stimulants or tonics should be gone through, and after the use of all of them, the first that was exhibited may again be given with equal benefit as at first.

In order to produce a more durable impression, and at the same time that nourishment is conveyed into the system, a considerable degree of stimulus may also be exerted; hot broths should be freely given; they may be rendered more stimulating by the addition of some of the aromatic condiments, as pepper or allspice.

As the duration of the disease is but short, every possible advantage ought to be taken. By the omission

sion of the medicines and nourishment for a few hours, the system may sink so far, as to put it out of our power to bring it up to the same point of vigour to which it had formerly arrived. It is only by keeping the system under the *uniform and powerful impression* of *these tonic medicines*, that I apprehend any good will be derived from them. By these means, the morbid state induced by the poison may be overcome; and if this be prevented from recurring again, by a due continuance of the same remedies, I apprehend this dreadful disease may be cured. For this reason the medicines and nourishment should be exhibited during the night, and if a tendency to sleep be perceived, a large dose of opium may be given. To timid minds, or those unacquainted with the nature of the complaint, and what a powerful stimulus it requires to make even a slight impression, danger may appear to attend the use of the quantities of medicine which I recommend as absolutely necessary for effecting a cure. But they may rest assured that these fears are groundless. In the tetanus, although it has been frequently cured by bark and wine, with similar medicines, yet I have known them objected to, because they failed in cases where it was asserted they had a fair trial; and on enquiry, I have found, that half an ounce of the former and half a pint of the latter were all that were given. That this quantity was useless, I believe will be readily perceived, when
it

it is known that the same quantity of both the femedicines is very frequently unable to cure a simple intermittent. Several ounces of bark and a quart of wine, or more, in a day, beside the intermediate use of other medicines intended to co-operate with the former, I should deem barely sufficient to counteract the impression made by the poison on the system, and to restore that tone which is essential to health. For although in health a single glass of wine will produce the same effects in some that are observed from a bottle of wine in another, yet when the former labour under a *typhus*, where powerful stimuli are required, in consequence of the powers of life sinking, it is well known that the latter quantity may be drank in the course of a day with scarce any effect, when, on the return of health, a single glass of it will be rejected.

Musk may be given as an auxiliary, but in doses not less than a drachm every hour; for I much doubt the common opinion of its strong antispasmodic powers, as it appears to be one of those medicines, of which a false idea has been formed of its efficacy, from judging of its sensible qualities.

To act with the same intention, but in a much more powerful manner, *Æther* certainly ought to be given. The wonderful property of this justly esteemed medicine, in calming spasmodic affections
and

and the suddenness of its operation, promises much benefit in this disease.

In case the difficulty of swallowing should be so great, as entirely to prevent the use of these medicines by the mouth, they should be given by way of injection into the bowels, and combined with a large proportion of laudanum, at least half an ounce, in order to prevent them from running off; it will be perceived that, in this mode of exhibition, still larger quantities will be required, and at shorter intervals, in order to produce the same effect, than when given by the mouth. I apprehend, that much advantage will also be derived from *mercurial ointment* rubbed on the throat and neck. This has been hitherto generally used as a preventive, and discontinued whenever the mouth became affected with it. In the few cases in which it was used in the cure of the constitutional disease, two or three drachms rubbed into the bitten part have been thought adequate to its removal; and, because in these partial trials it has failed of having the wished for effect, it has been declared totally useless.

Instead, therefore, of this partial and feeble use of mercurial ointment, I would advise half an ounce to be rubbed in the throat three times a day. By thus applying it to the parts more immediately affected, the benefit of the unctuous quality of the ointment,

ointment will be obtained, and the specific effects of the mercury suspended in it will also be exerted, and the morbid sensibility of the throat thereby lessened. The good effects I have seen derived from its use in the tetanus*, in relaxing the jaws, and lessening the difficulty in swallowing, induce us to expect the greatest benefit from its use in the present disease.

The influence of *depressing passions of the mind* in producing the disease, was formerly shewn to be very considerable; they will of course certainly assist in favouring its continuance. Every possible care ought, therefore, to be taken, to preserve the most equable and serene temper, and the utmost hope and confidence ought to be inspired. The idea of the propensity in the sick to *bite*, which may deter some from affording the requisite attendance, has no *foundation in truth*. *Systematic* writers †, indeed, terrify us with apprehensions on this head:

* In a case of tetanus, which occurred last winter in the Pennsylvania Hospital, during the attendance of Dr. Rush, half an ounce of mercurial ointment rubbed on the throat was attended with the most beneficial effects in relaxing the jaws, which were so obstinately closed as to prevent the introduction of the least medicine or nourishment. In the course of twelve hours, by the use of the ointment, the patient could easily swallow: from the omission of the ointment, the symptoms again returned, and the cure was finally completed by large quantities of bark and wine.

† Sauvage, Boerhaave, and Van Swieten.

but the *unfettered* and *candid* historians of *real* cases of the disease assure us, that *no* such symptom *ever* occurs.

Melancholy experience having so often taught us, that the effects of the poison are powerful, reason plainly points out, that, in order to counteract them, active medicines should be used. The very large doses of those I have recommended, may seem alarming to some; and it may be apprehended, that the debility, which I have constituted the proximate cause of the disease, may not only be removed, but a state of the body brought on, directly opposed to the former, and which will require contrary remedies. No apprehensions, however, need be suffered on this account, as it is the *ardor febrilis*, which Boerhaave esteemed so necessary to the cure of the venereal disease, or that kind of *inflammatory diathesis*, which Dr. Rush* has also deemed essential to overcome tetanus, that, in my opinion, is *alone sufficient* to counteract the effects of the canine virus on the system. Unless this be effected, no remedy will be successful. It is unfortunate that the enemy is obliged to be attacked on the most unfair grounds; for, by the difficulty in deglutition, we are deprived of the very means which, in most other complaints, remain free for overcoming the

* Med. Inq. and Obs. p. 172.

disease: were this obstruction not in the way, I entertain no more doubt of the efficacy of the *tonic* plan of treatment, than every one must do of the injury of a contrary practice. In the preceding pages it was shewn, that notwithstanding the difficulty patients labour under in commanding the requisite muscles to swallow, it can be in a *great measure* surmounted by a strong exertion; the patients should accordingly be advised to use their utmost endeavours to take freely of their medicines, as the only means of success.

But, as a successful practice can be the only test of the efficacy of any particular mode of treatment of a disease, it may be asked, where are there any proofs of its cure by the remedies here recommended? To this I would reply, that however impossible it may be to adduce cases of their success in the *cure*, as I have never had an opportunity of trying them, yet I am happy in having it in my power to adduce *two*, in proof of the propriety of the method of prevention I have advised. The first was communicated to me, and afterwards to the public*, by Dr. William Weston, of the parish of St. Ann's Bay, Jamaica, in the Number of the American Museum, subsequent to the one in which I had inserted some remarks on the disease,

* American Museum, vol. VIII. p. 100.—Sept. 1790.

and had declared my opinion of the probable success of the tonic plan of treatment; the particulars are as follow :

“ In January last, a negro boy was bitten in the
 “ hand by a dog, to all appearance as mad as ever
 “ I beheld one; he also bit two sheep, and was then
 “ killed. Being called to the boy, a short time
 “ after his receiving the bite, I immediately dilated
 “ the wound, and filled it with strong mercurial
 “ ointment, having in it a large proportion of com-
 “ mon turpentine, which caused it to inflame consi-
 “ derably, and discharge freely. I also gave him
 “ bark in substance, with wine, for eight days, gra-
 “ dually increasing the dose, during which time,
 “ not the least symptom of the disease appeared.
 “ The boy continued perfectly well when I left the
 “ island, which was in July last. The two sheep,
 “ which were bitten nearly at the same time, died
 “ in ten days afterwards, raving mad*.” The Doc-
 tor adds, “ Although the forming a general rule

* The success in the above case was in all probability owing to the external or local treatment made use of; as from the short time that the bark and wine were given, it is impossible to ascribe any of the good effects to them. In order to have acquired any pretensions to the prevention of the disease, they should have been continued a much longer time, and until the common period of the attack had passed, as I have mentioned in the preceding pages.

“ for

“ for the treatment of a disease, from the successful
 “ termination of a single case, cannot be allowed ;
 “ yet I shall be happy, if recording the above
 “ shall induce a confidence in other practitioners,
 “ to give the same mode of treatment a fair trial
 “ in this disease, which I have no doubt will prove
 “ equally successful in the *cure* with others, as it did
 “ in the prevention of it with me.”

The other case alluded to, is one communicated
 to me by John Shore, M. D. of Petersburg, Vir-
 ginia, in a letter which I received from him, dated
 the 17th October 1791.

“ On the 1st of February 1791, a negro girl,
 “ about 16 years of age, was bitten on the right
 “ shoulder in three different places by a mad dog,
 “ which, at the same time, was seen to bite a
 “ dog and a cow. They both ran mad, the cow
 “ on the 21st, and the dog on the 28th, of the same
 “ month. I saw her the next day about 30 hours
 “ after the accident, when I immediately directed
 “ my whole attention to the wound, by making
 “ upon it large and deep scarifications, after which
 “ the lunar caustic was applied, the parts filled
 “ with strong mercurial ointment, and the whole
 “ covered with a blister, in order to excite inflam-
 “ mation in the wound, and to keep it open as long
 “ as possible, on which I conceived the other, and
 “ still

“ still more important, part of the cure depended.
“ The mercurial friction was then directed in such
“ quantities as to affect the mouth speedily, with
“ the occasional use of opium to procure sleep and
“ rest; after this, the tone of the system was perfectly restored by continuing the use of the bark
“ and wine for some time. No symptom has ever
“ yet appeared, and I consider the girl as quite cured.”

A P P E N D I X.

Cases of Hydrophobia.

BY J. SHADWELL, M. D. C. M. S. OF BRENTWOOD.

READ FEBRUARY 21, 1790*.

THE numerous remedies which medical annals furnish for the hydrophobia, and the infrequency of success in the cure of it, point out how little dependence is generally to be placed upon medical testimony.

In the recital even of those cases wherein the treatment has been reputed to have overcome the hydrophobia, death has usually ensued, either a few hours after the cessation of that symptom, or, at farthest, upon the following day, which rather indicates, that the powers of nature were exhausted by the disease, than that a cure was effected by the medicine.

* Extracted from the Memoirs of the Medical Society of London, Vol. III. p. 454.

The idea of 'preventives conveys something too absurd for serious discussion; for, as among ten persons bitten by the same dog the infection will not probably affect more than one, the celebrity of such medicines or applications hath arisen from the supposition only of averting an evil, which I dare affirm would, even without their aid, have never existed.

Every symptom has more or less varied in the different objects of its fury, but no one more so than that of the madness. To prove this assertion, it were an easy task to extend this paper with quotations from tribes of authors; but the learning of the members of this society will readily supply the absence of such references.

In regard to the affection of the mind, a very striking contrast is furnished by the two patients, the subjects of this paper, who came under my observation. During the agony with which the convulsion agitated and writhed the body of the first, his mind retained her faculties almost wholly unclouded, and he wished for death, as the sole emancipation from hopeless pain and misery. Sense, during the continuance of each paroxysm, forsook the other; through the first days, except when interrupted for the exhibition of the remedy, or in the paroxysm, he preserved a sullen silence.

Of

Of the dogs which occasioned these calamities I have carefully collected every possible account; deeming all attention to this animal of the utmost importance to the safety of individuals;—of an animal too, who, educated in the bosom of man, is thus unhappily perverted into his most formidable enemy.

Several writers have alleged that, previous to the canine madness, the dog always grows melancholy and fond of solitude; that he rejects first solid food, and that after this progression, the hydrophobia commences. In this concluding and highly infectious state, wherein he is said to exist only thirty hours, he knows not his owner, and indiscriminately attacks all he meets. In general it may perhaps be the case; but in the first instance the dog had the preceding moment eaten bread and milk, his usual breakfast, and turned immediately upon the following unhappy victim of his fury; he next attacked and bit his master, an aged man, both in the hand and leg; upon this he ran to a farmer's, about two miles distant, and bit two dogs (both of which have since gone mad), and two children; thence he returned home again, where, after biting a pig and killing a fowl, his further ravages were fortunately prevented.

CASE I.

On Sunday the 19th day of December 1790, I went to see Joseph Wyburn, a youth of fifteen years of age, who had been bit in the left hand by the dog just above described. At some distance from the house his shrieks were very distinctly heard. I enquired when they first perceived him to grow ill, and was informed, that on the Tuesday night preceding he complained of pain in his left ear, which being imagined to be merely a cold, they advised him to go to bed.

Upon Wednesday morning he complained of the pain extending down his neck to the tonsils. They observed that on this night he seemed melancholy, and rather avoided their company; he drank however some warm beer, and, going to bed, slept well.

On Thursday he attended the horses, his usual employment, but appeared, according to their phrase, very comical and odd in his behaviour. In the night he alarmed his master by sudden shrieks; and rushing into his chamber, declared there were thieves in the house, and that there were others endeavouring to steal horses out of the stable; and pointed to lights, which he swore he
saw

saw passing to and fro, and described the dresses of the people : this, upon enquiry, being found to be totally groundless, caused, for the first time, suspicion in his master's mind ; but they pacified him, and he returned seemingly contented to his bed.

On Friday morning, upon offering milk, he turned from it with shuddering, and said he could drink tea ; this being procured, he rejected it with horror, and began by clinging to the mantle-piece, to writhe his body ; from thence he hastily turned round from the air, and, to the astonishment of the spectators, he ran up stairs as fast as could be conceived, backward, in order to prevent, according to his own words, the air from stifling him. In his chamber he fell into a most violent convulsion, which lasted some minutes ; being entirely debilitated by the spasm, he made a few drops of urine, the last evacuation he had, and sunk into a swoon. In this state he was conveyed to his bed, where, being attacked by the spasm, four stout young men with difficulty mastered him : they confined him by sheets formed into broad bandages, leaving the fore arm only at liberty : different kinds of food, liquid and solid, were repeatedly offered ; the former was rejected with the utmost horror, though he complained of violent thirst, and seemed pleased with the idea of drinking.

On Saturday all the symptoms were exacerbated, and the master began then to suspect the futility of the sea-bathing, and of the Ormskirk medicine, both which had been tried upon himself and the boy, under the strongest assurance of perfect safety. I shall omit any farther detail of the vain attempts by the master and his friends, to force sustenance down, until the Sunday evening when I first saw him.

Fancy cannot paint a more distressing scene.—He lay writhing his body into every posture which his confinement permitted; but which the violence of the spasms and convulsions in a great measure subdued: the pupils most amazingly dilated; the nails of the toes and fingers perfectly bleached; the saliva streaming from each side of the mouth; and every muscle in a state of great rigidity! The mournful silence of the family was every instant interrupted by his shrieks; his pulse was extremely low, and the skin cold to the touch; yet he complained of burning oppression and lancinating pains, as if of pins and needles, about the region of the stomach. I requested him to shew me his tongue; after several efforts, which evidently caused pain, I obtained a transient glimpse of it—Nothing particular appeared but a lead-coloured stripe running along the middle of it.

Although from the duration of the attack I had no hopes, I resolved however to try the mode of cure described in the second volume of our Memoirs. Oil was procured with the utmost speed, and I had him immediately anointed from head to foot; I then directed some oil to be presented to him in a wine glass; the sight of it produced convulsions. I afterwards had it put into a mug, and, with the assistance of three men, endeavoured to force some down his throat; this effort augmented all his sufferings, and with tears and cries he entreated us to desist. As previous to his misfortune he had known me, I reasoned with him, and begged of him to try; he consented, but upon the oil being cautiously and gently advanced towards him, he wept bitterly, turned his head away from it, and declared his desire rather to die than to attempt any further endeavours at drinking. After repeating the unction again, I quitted him late at night, leaving directions to the attendants to rub him repeatedly all over, and, if possible, to get down some oil.

Early on Monday morning I visited him. They had anointed him three times in the night; but the attempts to make him swallow proved futile, and only made him outrageous; for upon seeing me he declared he would bite and spit at the person who endeavoured to force it down. He complained
to

to me of great stoppage in his throat, and load at his stomach, and said he could vomit if carried into the air. On the opening of the window he fell into convulsions; the rigidity of the muscles was the sole alteration I could perceive. Finding by the total want of pulse, and the lividness of his skin, &c. that death was advancing with rapid strides, I agreed to desist; but Doctor Sims, who was then on a visit to me, and accompanied me to see him, proposed enemata of oil and fat mutton broth; this intention was only once effected with the utmost difficulty; and after some violent paroxysms, the saliva streaming more copiously than ever from one side only of his mouth, he quietly expired that night at half past eleven o'clock.

During the whole disorder he had no priapism; he scarcely ever lost his memory or recollection: for a moment he sometimes raved about dogs, declaring he would kill them; but he knew the bystanders, and being questioned, repeated their names, and pointed to each. I sent to his father for permission to open his body, but ignorance and prejudice refused this satisfaction.

The wound on this boy's hand never tumefied, nor appeared inflamed; he said it felt rather sore.

From

From the Saturday until the fatal evening of his dissolution he never swallowed any thing; but he retained his sight, notwithstanding the pupils of his eyes were so vastly dilated.

I mentioned a pig being bitten by this dog in the ear, which made it bleed copiously. Nine days from the time of its receiving the wound, it alarmed the people by displaying unusual agility: it repeatedly sprang off the ground to the incredible height of a dozen feet, as they said, and afterwards, bending its fore legs underneath its belly, it stretched out its neck, which it rubbed strongly against the ground by forcing itself along the yard with its hinder legs. In that attitude they killed it.

From this case, which in some symptoms disagrees with others I have perused, but accords in its tragic catastrophe, I have the pleasure to turn the attention of the Society to the recital of another, which, in its conclusion, is, I believe, almost original.

CASE II.

John Cumbers, a drover, aged twenty-two, was, on Saturday the 11th December 1790, bit by his own dog between the thumb and the index of the left hand. He continued well until the Monday
week

week following, when his appetite was observed to decline; and he became low-spirited and melancholy, sighed frequently, and complained of failure in his sight.

Wednesday the 29th he complained of violent pain in his head; that evening he was seen standing in the street as if rooted to the ground, for a quarter of an hour, his eyes being motionless, and their pupils greatly enlarged. The person who first observed him, endeavoured to rouse him from what he supposed a trance, by feigning to strike his face with a small stick, which he advanced close to his eyes, but without any effect. His sister entreated him to return home; without replying, he rushed violently into his house, seized his mother, and bit her head; her outcries alarmed the neighbours, and several men ran to her assistance, some of whom he bit, but who with difficulty overpowered him, and kept him in his bed. That night Mr. Weld, an ingenious surgeon at Romford, was called in, who found him raving without an interval of reason. The strait-waistcoat was judged necessary: Towards morning he became calm.

On Thursday he was very melancholy; his eyes were fixed, and the pupils much dilated. About seven o'clock in the evening the convulsive paroxysm

roxyfm. recurred, and continued an hour; but he passed that night more composed.

On Friday morning early I saw him; there was then a peculiar rigidity observable, particularly about the muscles of the lower jaw; he rejected liquids and solids with horror, and was visibly affected by the cold air. Upon inquiring what treatment had been adopted, I found the mother had procured some trivial herbs, ground-ivy, &c. recommended by her acquaintance; the infusion made from them she had been unable to get him to bear the sight of. I proposed to Mr. Weld the treatment I had endeavoured to adopt in the case of Wyburn. Oil was directly sent for, and putting it into a pewter tea-pot, I desired it to be administered. He struggled furiously, and bit off the spout: he was then anointed from head to foot. The next trial for the internal exhibition of the oil proved rather more successful: it was poured into a pewter pap-boat, and his mouth being forced open, some little of it obtained a passage: notwithstanding these difficulties, the internal and external exhibition of the oil was assiduously persisted in. The paroxysm at eleven o'clock that night recurred with great violence.

Saturday, the 1st of January 1791, he was quiet, except when drink was offered, or that dogs were

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mentioned

mentioned in his hearing, which evidently produced great disturbance in him. He was rubbed repeatedly all over; and in the night a degree of sense returned, and he drank, but with much uneasiness, a little quantity of water, and relapsed into his usual state about an hour after.

On Sunday morning the symptoms continued similar; but towards the afternoon he began to shew signs of returning reason: he called for drink; broth being presented to him, he rejected it with evident marks of horror; but what enlivened my hopes, he swallowed some water not long after. Upon his mother's questioning him, whether he knew her? he with tears shook his head, and exclaimed, "Lord have mercy upon me." At eleven o'clock that night the paroxysm returned, but in a slighter degree.

On Monday he was perfectly composed, and his mother had, without his knowledge, loosened the straight waistcoat; finding himself at liberty, he begged to be confined again, for fear of doing mischief.—There was no return of the paroxysm that night.

On Tuesday he was remarkably affected by noise and cold air, which he avoided by covering his head with the bed-clothes.

Wednesday

Wednesday and Thursday afforded no particular alteration.

Friday a further progress in amendment took place; his countenance appeared better, the pupil of a more natural size, and he took sustenance without fear.

On Saturday the recovery seemed to advance rapidly; but he discovered great antipathy to the person who was the principal instrument in administering the remedies.

On Sunday every symptom of the hydrophobia and the convulsions ceased; he was perfectly collected, and complained of unusual soreness, chiefly about the jaws.

During the illness, from the day I first saw this patient, most plentiful frictions of oil were employed, his whole body from head to foot being repeatedly anointed with it; between three and four ounces of it were exhibited internally, the dose being increased with the facility of administering it.

In the earlier stages of the disorder I had besides clysters of fat mutton broth frequently injected both as a means of sustenance and succedaneum for oil.

In this patient the bite assumed a slight appearance of inflammation, which subsided gradually with the recovery; the pulse never varied, but continued at 45 during the whole confinement; very high coloured urine was passed the second day in a small quantity, but there was never any erection of the coles. He remained costive until the first clyster was given, to which an evacuation very soon succeeded. The oil was continued to be used ten days after the absence of every symptom; but a great degree of debility attended his recovery: perfectly unconscious of any occurrence during his illness, the time that passed between its commencement and cure now presents a blank only to his mind.

This dog, which was of the cur kind, discovered the symptoms of madness first, by shunning people, and refusing food; his eyes watered exceedingly, and the fiercest mastiff fled in dismay before him. Nor was this effect confined to one dog; for he ran at several, all of which shewed the strongest marks of apprehension, and, when bitten, howled in the most pitiable manner. He then fled some distance to a farmer's yard, where he bit the mastiff, and other dogs, who, upon receiving the wound, uttered a yell, and betrayed the greatest fear and anxiety; soon after which he was killed.

I have thus related every symptom which in this last case was observed both by myself, and confirmed by the joint attention of Mr. Weld, a gentleman whose skill and humanity I seize this method of publicly acknowledging.

To the splendid abilities and profound learning of Doctor James Sims, the medical world is indebted for the revival of a practice, whatsoever it be, that has simplicity and ease to recommend it, considerations peculiarly advantageous, as the objects most obnoxious to this disaster move in the humbler walks of the community. For myself, I am happy and proud to have been the instrument of its first successful application, and of the honour of communicating it to this Society.

P O S T S C R I P T.

Since I delivered in to the Medical Society the above Memoir, a case of hydrophobia has occurred at Sudbury, in which it was asserted, that the exhibition of the oil had increased and exacerbated the symptoms.

Anxious of having the experiment repeated in an accurate manner, I beg leave to state the treatment,

ment, which will shew that the practice in this instance adopted tended to invalidate nothing advanced in favour of the oil.

The patient was first blooded to the amount of sixteen ounces; then ordered to take two grains of opium every three hours, and the inside of his thighs and legs were directed to be rubbed every morning and evening with six drachms of strong mercurial ointment, and frictions of oil to his neck and chest every hour, until an oil bath could be prepared, into which he was immersed that same evening, and staid in it ten minutes.

This method being widely different, cannot, I presume, be adduced as an argument against that paper.

1792.

June 4. *The following Remarks on the Bite of a Mad Dog, from Dr. WHITE, of St. Edmundsbury, to Dr. LETTSOM.*

IN the last nine months this part of the country has been terribly infested with mad dogs, during which time it has been my misfortune to be applied to by several persons who have been bitten; and

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as the poet feelingly expresses himself, I have been "anxious and trembling for the birth of fate." Seven of these miserable objects were bitten by dogs quite unprovoked, and with every appearance of madness. Three did not apply till the third day, two on the second day, and two in a few days after the accident. Three others have also been with me for advice, who were bitten by a cow that had the hydrophobia. All of these, except two, had the injured parts wholly dissected out; the wounds well washed first with cold then with warm water; and the surfaces touched with lunar caustic: and I am in hopes, from the interval which has elapsed, that they are freed from danger.

One of the excepted two was bitten about eight months ago in the palm and on the back of the hand; in which case as much of the wounded part as could be with safety was removed, and the process of ablution was continued for near two hours; nothing having been done externally until the day I was consulted, which was the third from the accident. This person is in perfect health and spirits. In the other instance, the tooth of the cow had penetrated the end of the finger through the nail, on which account I thought myself warranted to deprive the patient of the first joint.

It is now five months, or more, since I was consulted about a foal which had been bitten by a mad dog five days before, through the wing of the left nostril. The wounded part was much torn. I ordered it to be cut out, and no other means were used. The animal is at this time perfectly well. A valuable horse, a cow, and two pigs, were bitten by the same dog, on the same day, to which internal remedies only had been administered; they all died within the month.

Similar collateral circumstances were also proofs of the dogs being mad in five out of the seven instances before mentioned, on which external means only were employed.

Two persons on whom excision and ablution had not been performed, and to whom medicines of false repute had been given, fell wretched victims to their credulity.

This brief detail of accidents that have lately fallen under my direction, together with the remembrance of four cases of hydrophobia, which I have been called to in the course of my practice, have given rise to the following suggestions:

That the virus may be exterminated by excision many days after the injury.

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That the first sensible mark of action is a pain in the injured part.

That the consequent symptoms and sensations have a much nearer relation to spasm and inflammation.

That the lymphatic system is not affected in like manner to what it is from the insertion of variolous, or any other infectious matter, supposed to be carried into the habit by absorption.

Admitting these premises, Is it not probable that the virus lies dormant till the previous symptom of pain in the bitten part comes on?

Might not excision and ablution afford relief *at that period?*

May not the future progressive symptoms be produced by irregular excitement on the nervous system *only?*

Is it absolutely impossible to give relief by excision and ablution, when the patient is afflicted with *hydrophobia?*

As the virus is most commonly, perhaps solely, generated in animals that never perspire, will the cow, or any other kind of creature not subject to that restriction, produce, or in the accidental hydrophobic state communicate, this disease?

Dr. de Moneta, Physician in Ordinary to his Polish Majesty, has published the sole preservative against Hydrophobia, or the effect of the bite of dogs, or other animals, when mad; but not having seen this work, which was printed at Warsaw, in 8vo. I have made the following quotation, inserted in the Appendix to the Critical Review, new arrangement, vol. V. p. 551.

“ Though this work be foreign to our present department, we must beg leave to give some account of it. For the sake of philanthropy, it is to be wished, that the remedy may be as certain as it is easy. The Doctor first advises to cover the wound with fresh earth, or with snuff, to imbibe the saliva of the animal, and then to wash it with water; at the same time, warm half a pound of butter in four times as much vinegar, and when the wound is cleared, apply a compress of linen steeped in that mixture, and moisten it very often with the same for nine days; after which time you may safely remove the compress, and cure the wound in the usual way. During the time that the vinegar is used outwardly, the patient must take it internally, four times a day, in doses of an ounce and half of vinegar, warmed with a little fresh butter; and his common drink, for at least fifteen days, must be pure water, with a little vinegar or juice of citron. Any strong liquor is extremely hurtful, as is any emotion
of

of anger or impatience. Plethoric patients may be bled; but this precaution the author regards as little necessary. Dr. de Moneta has used the same remedy against the bites of vipers and other venomous reptiles, and always with success. He has prevented the hydrophobia in more than sixty people; and many other physicians, who have followed his method, have found it equally efficacious. It is remarkable, that in Italy vinegar has also been lately discovered to be a remedy for this dreadful disorder."----I have, however, been informed, that this remedy has since been tried, without any effect.

IN Germany, particularly in the Electorate of Hanover, the root of the Belladonna (*Atropa Belladonna*), has been given as a preventive of the Rabies Canina, for upwards of thirty years; and this vegetable has even been said, in some instances, to have succeeded, after symptoms of hydrophobia have ensued. However dubious the facts hitherto produced in its favour may appear, certain it is, that in some cases, wherein this remedy has been exhibited, it has totally failed. The dose of the roots powdered, as it was originally given, was not by weight, but by measure of a tea-spoonful, to an adult, once in forty-eight hours; an eighth part to a child of two years old, and a spoonful and an half to a cow. It has been since more accurately

ascertained by weight, viz. to an adult, fifteen grains; to a child six years old, five grains; to an infant of four years old, three grains and a half; the dose to be taken in the morning, fasting. Of late the leaves of this plant have been substituted for the root; but in rather smaller doses. I believe, however, this supposed remedy has no longer maintained its character.

THE following account of the method generally used in some of the Northern parts of America, for the prevention and cure of the bite of mad dogs, was communicated to the Editor, by Dr. Dexter, of Boston, New England, in January, 1791.

As soon after the bite as possible, the part is washed in warm water, well saturated with common salt; and then scarified and cupped, if the wounded part will admit of its being done; after wiping the part dry, from one to two drachms of strong mercurial ointment is rubbed on the wound and the parts adjoining. This application is repeated every morning for eight or ten days. The wound, if the weather be warm, is covered with linen; only if cold, with flannel. If the wound appears foul, it is dressed with some stimulating ointment: if no appearance of ptyalism on the tenth day

day, take place, four or five grains of turbith mineral, with an equal quantity of camphor is given, and usually repeated every third day, till a gentle spitting takes place; during the application, the patient abstains from strong liquor, flesh, and high seasoned food, and also from cold air; his exercise is gentle. The mercurial friction is used as the subject is able to bear it, for twenty-five or thirty days. If the injured person, as frequently happens, has made no application for two or three weeks, a free use of the mercurial ointment to the part, and the internal use of turbith mineral, has answered the purpose completely.

Directions

Directions to prevent Canine Madness, by Ablution,

BY DR. HAYGARTH, OF CHESTER.

Near Wrexham, in North Wales, three men died of Canine Madness, in the Autumn of 1788.

These melancholy cases spread a general alarm. But it ought to give great comfort and satisfaction to any one who may be bitten, to know that there is a safe, easy, and effectual method of preventing infection; which can seldom give pain, or require skill, and is in the power of every person to employ. It is generally allowed by physicians, that the spittle of a mad animal, infused into a wound, is the only cause hitherto known, that can communicate canine madness to the human body. This poison does no sudden mischief, is not immediately absorbed into the blood, and sufficient opportunity is given to remove it, before any danger can arise. When a person is bitten, the plain and obvious means of preventing any future injury, is, first, to wipe off the spittle with a dry cloth, and then to wash the wound with cold water. After a plentiful affusion of it, warm water may be applied with safety and advantage; and not slightly and superficially, but abundantly, and with the most persevering

vering attention ; in bad cases, for several hours. A continued stream of it poured from the spout of a tea-pot, or tea-kettle held up at a considerable distance, is peculiarly well adapted to the purpose. If the canine poison infused into a wound was of a peculiar colour, as black; like ink, we should all be aware that plenty of water and patient diligence would effectually wash out the dark die; but this could not be expected by slight and superficial ablution. After a bite has been carefully washed, colour it with saliva tinged by ink, &c. When some hours have elapsed, wash out the stain. A visible proof may thus be obtained, how soon and perfectly water can cleanse a wound from saliva. As an argument that slight washing of the wound is not sufficient to cleanse it effectually from the poison, we may mention, that, in some cases, after inoculation for the small-pox, the poisonous matter has been attempted to be washed out of the wound, by persons who wished to prevent its effects : yet the inoculated small-pox appeared at its proper period. These unsuccessful attempts were performed secretly, hastily, and timidly, by a female hand. But in a case where the inoculated incisions were probably washed with greater care, infection was prevented. Such facts teach us the importance of patient perseverance in washing away the poison ; but they need not abate our confidence that such perseverance will certainly be successful.

The ablution should be accomplished with great diligence and without delay; and may be performed by the patient or any assistant. However, as the apprehension of this dreadful disorder always excites the greatest anxiety, a surgeon's advice and assistance ought to be obtained, as soon as possible, in all cases where the skin is injured. He will execute these directions most dexterously and completely. In a bad wound, the poison may be conveyed deep into the flesh, by long teeth or lacerations. In such circumstances, he should open, and wash, and, whenever any painful uncertainty can remain, he should cup and syringe every suspicious place. If the bite has been neglected, till the inflammation begins, he should, after shaving off the inflamed surface, cup, syringe, and wash with double diligence. By this method of purification, it cannot be doubted that every particle of poison, and, consequently, that every cause of danger, may be effectually removed.

Hints towards the Investigation of the Nature, Cause, and Cure of the Rabies Canina: addressed to Dr. HAYGARTH. By THOMAS PERCIVAL, M. D. Fellow of the Royal Societies of London and Edinburgh, of the Royal Medical Society at Paris, of the Royal Society of Agriculture at Lyons, and of the Philosophical Society at Philadelphia, &c.

YOUR proposal, my dear friend, for obviating the baneful effects of the bite of a mad dog, communicated November 17, 1788, claimed my immediate attention; and I wrote to you by the subsequent post, that no delay might take place in the execution of your benevolent project. I have since read and thought much on the subject; and shall now transmit to you the result of my better information, and more deliberate reflection. To your candour I can lay myself open without reserve; and from your judgment I shall be equally happy to receive either the correction or confirmation of the following suggestions, relative, I. to the nature and cause; II. to the prevention; and III. to the cure of hydrophobia.

I. I do not perceive any strict analogy between the action of the canine virus and that of the lues venerea, of the small-pox, or of the viper. These

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evidently affect the lymphatic system; and their progress into the course of circulation may be readily traced, which is not the case with the poison of a mad dog. Are we then fundamentally right in the idea, that the bite of a rabid animal operates by absorption? Might not its effects be, at least as well, if not better, explained by ascribing them to local nervous irritation; propagated in different periods of time, according to the varying circumstances of sensibility and irritability, to the brain, and from thence to the fauces, gullet, and stomach? Are not all the symptoms induced of the nervous and spasmodic class? Or, do any marks appear, in the human kind, of a specific vitiation of the fluids?

There seems to be a striking resemblance; in many particulars, between some species of tetanus and the rabies canina *. Now, tetanus is known to be produced, in certain states of the body, by local irritation, without the least suspicion of any absorption of poison, or contamination of the fluids.

* Dr. Currie, of Liverpool, informs me, that in a case of this disease (tetanus) in which wine proved an effectual remedy, it could only be swallowed at certain moments of diminished constriction. At other times, if it was shewn to the sufferer, the sight produced evident distress; and if it was advanced towards his mouth, it never failed to bring on convulsion. The proper season for administering it was learnt from the patient's signal, as he spoke
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Mental impressions have repeatedly excited hydrophobia. Some time ago, I attended a clergyman, who laboured under many of the symptoms of it, through the shock occasioned by an official visit to one of his parishioners, dying of that disease. He had no opinion of the Ormskirk powder, but the Tonquin remedy (musk, cinnabar, &c.) perfectly cured him. As Physician Extraordinary to our Infirmary, my advice is sometimes called for on particular occasions. I was not long since consulted about a man, bitten by a supposed mad dog.

with great difficulty, and with every precaution, deglutition was interrupted twice out of three times, that it was attempted, by the accession of convulsion. The wound, which gave rise to the disease, was so slight and so nearly healed, that it had escaped the patient's notice. If it had escaped the notice of the attendants also, and if they had been unacquainted with the actual appearance of tetanus, my very judicious friend conceives it possible, that the disease might have been named hydrophobia.

The following narrative, which is of a similar kind, I received from Dr. Darwin. A young man had his ankle much torn and bruised by a fall from two horses, which he rode at the same time, standing upright, on their backs. In a few days, a difficulty of deglutition occurred, and he became totally convulsed, on attempting to swallow fluids. Two open ulcers, near the ankle, were then laid into one; the operation however was in vain. Amputation was then proposed, but rejected: and in spite of the use of much opium, and mercurial friction, about the fauces, he died on the succeeding day. In this case, the Doctor justly observes, the hydrophobia was evidently produced by sympathy with the wounded parts.

He had the usual affections of the disease, though in a slight degree, which were removed by mercurials and antispasmodics. When the man was recovered, and qualified to state minutely, and without anxiety, the circumstances antecedent to his attack, I was perfectly convinced that his malady had originated solely from the terrors of imagination. In such cases, there can assuredly be no ground to impute the malady to the absorption of any poison; and it must be ascribed entirely to nervous irritation,

The accurate Morgagni has related a case of hydrophobia, occasioned by the bite of an enraged cat, which was not mad. The virus in this case, if virus is to be supposed, could not be of the specific kind belonging to an hydrophobic animal. And the symptoms are to be accounted for in the same way in which we explain the consequences of a wounded tendon, or the splinter of a fractured bone, when such causes produce a locked jaw or tetanus.

The virus of the small-pox, or of the lues venerea, very rarely fails of producing its baneful effects on the body, when applied. Whereas the bite of a mad animal is not found to be deleterious in a very large, though indeterminate number of cases. Is not such a difference thus explicable? The former is transmitted into the system by absorption

forption, through a series of vessels, which are uniform and regular in their action. The latter is, perhaps, poisonous only to certain nerves, under certain conditions; so that the chance is always great against its operation. Just so it is with wounds or injuries of the tendons: these are very rarely succeeded by a locked jaw, and only under peculiar circumstances.

That a nerve is capable of irritation, independently of the brain, whilst the vital energy subsists, is evinced by the contractions of the heart, produced by pricking or wounding it, when taken out of the body. May not this be the power which is first excited by the canine poison; and which requires an indefinite time to operate, before it communicates with the brain, or rouses the perception of injury done to the system? We are informed by a celebrated anatomist (Monro), that the nerves resemble the brain in structure; and that, as they proceed in their course, they acquire additional energy.

Morgagni asserts, that the poison of a mad animal has been known to remain latent even for twenty-years, till being excited into action by some cause, certain destruction was the consequence. This information, however, he delivers, not on his own authority, but as what he believes to be founded in truth,

truth: Whatever doubt may be entertained of its credibility, there can be none of the case, which the same author relates, of a boy under his own inspection, in whom the symptoms of the hydrophobia came on five months after a bite in the leg, by an animal not then known to be mad. And Dr. Vaughan has given us lately the history of a patient, who was bitten in September, without any appearance of canine infection till the sixth of June following. It is evident, therefore, that the injury done may long remain topical, and so slight as not to be perceived. This occurs in affections confessedly originating in the nerves*.

A difficulty in swallowing liquids, or the dread of water, is not always a concomitant of the other symptoms incident to persons bitten by mad animals. This only shews a variation in different subjects, in the sympathetic powers of the nervous system. And I have lately met with an equal degree of diversity in an affection of the jaw, produced by an injury from a bodkin in the tendons

* Some time since, I attended a lady, who had received a bruise on the os sacrum, by a fall, when she was young. She soon recovered from its effects; but eighteen years afterwards, the rheumatism fixed on the part, was attended with unusually excruciating pain, and long resisted the remedies commonly employed with much more speedy success in that disorder. In this case, we may presume, there subsisted a morbid topical affection of the nerves, which a subsequent cause rendered manifest.

of the hand. The wound soon healed without any inflammation remaining; the pain was not constant, nor at any time intense. No stiffness was felt in the jaw; but, on the contrary, a weakness and inability to prevent its dropping. The lady chewed and swallowed with ease; but on reading aloud, she had a pain in the maxillary articulation: nor could she prevent frequent yawning. This patient had been long an invalid, previous to the accident; and there was reason to suspect, in her case, some antecedent morbid affection both of the brain and of the spinal marrow.

Dissections have hitherto thrown little or no light on the nature of the rabies canina. Morgagni, though he has related many histories, declines to draw any conclusions from them; observing from a comparison of all, that the dead differ much more from each other than the living. We must therefore be content with conjecture; and adopt with diffidence that hypothesis, which appears most consonant to reason and to truth. And this must be our clue in the treatment of persons who may be, or who are actually sufferers by the bite of rabid animals: for we have yet to learn that mode of practice, on the success of which we can place any just dependence. Your proposal, therefore, of a more likely mean of prevention than any yet suggested, merits the cordial thanks of the public.

II. Agree-

II. Agreeably to the rules of your printed paper, let the patient, with as much expedition as possible, wipe off the spittle of the dog with a dry cloth (suppose his handkerchief, as being always at hand), and then abundantly, and with the most persevering attention, wash the wound with water. The preference you give to cold water, for the first ablu-
tion, is judicious; and accords with the idea, above advanced, that the nerves are the parts alone injured by the canine virus. They may thus perhaps be rendered torpid, and the virus may be greatly diluted or washed away, before they recover such sensibility as to be capable of suffering from its action. Ligatures, placed above and below the wound, would contribute to the benumbing action of the cold water*. When this has been sufficiently applied, warm water should be used, not only as a better solvent, but to produce a flow of blood; which, coming from numberless small vessels, may tend to complete the cleansing of the wound†. At this time the cupping-glass would be a good auxiliary‡.

* From the experiments of Abbe Fontana, concerning the bite of the viper, it appears, that ligatures, round the bitten limb, had a very salutary effect.

† Plunging the part, infected with the poison of a viper, into warm water, and keeping it therein some time, appeared to Abbe Fontana to be truly advantageous.

‡ Vide Cels. lib. VII. cap. 23. §. 3.

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When the part bitten may be supposed to be as much freed from the poison as can be accomplished by ablution, additional security may, perhaps, be afforded by bathing it very well with the gastric juice of a healthy animal, recently killed. The penetrating quality of this fluid; its energy as an almost universal solvent; and its power of rendering even poisons not only innocent, but nutritious, promise a salutary operation under the circumstances described. If we are to expect an antidote to the canine virus, this fluid seems more likely to prove such, than any other substance yet discovered. For I have somewhere seen it recorded as a fact, that a piece of meat, imbued with the saliva of a mad dog, has been swallowed by another dog with impunity. The gastric juice of a carnivorous is more active than that of a graminivorous animal. A cat, a dog, or carrion crow may therefore be killed for the purpose. From the last, Abbe Spallanzani obtained this fluid in great purity without injury to the bird, by introducing bits of dry sponge into the stomach.

If the gastric juice be not attainable, probably the saliva of a healthy young person would be the best substitute; and it might be procured by the chewing of rennet, which has been well freed from the salt*. We are informed by Celsus, that the

* The rennet cannot be entirely freed from the salt, with which it is preserved, without depriving it of a considerable portion of

Pfylli sucked, without injury, the poison infused by serpents. The spittle is demulcent, inviscating, and capable of changing the qualities of bodies by its fermentative nature. One or other of these applications must therefore be renewed several times daily; and the part should be afterwards covered with a cataplasm.

In recommending the several foregoing means of prevention, I would not be understood to preclude excision of the part bitten, when the patient has courage to undergo the operation, and it can be accomplished without danger. But much time may be lost, before the surgeon arrives; the sufferer may long resist all solicitations to submit to the knife; the wound may have been inflicted on the face, or near some large blood-vessel; or there may be so little probability of the madness of the dog, as to render it unjustifiable to subject the patient to present pain, and future deformity. In all these cases, your plan of ablution promises much benefit; is liable to no objections; may be instantly executed; and will allow sufficient leisure for a careful

gastric juice. Perhaps the salt itself may have some salutary powers. Abbé Raynal asserts, that it counteracts the poison of the American Manchineel tree, vol. V. p. 369. Celsus recommends it in the bite of a viper, lib. V. 27. In Virginia, when the Indians are bitten by a rattle-snake, they lay to the part affected the radix Senekæ, well chewed, by which it must be fully impregnated with saliva. See Mead's Works, p. 44.

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and complete excision. The application of caustics has been found unsuccessful: and the explosion of gun-powder could hardly take place in a bleeding wound: nor could we secure its extension through the oblique course of the animal's teeth. To this last consideration you have judiciously paid attention, by directing water to be poured on the wound from the spout of a tea-kettle.

On the supposition that the hydrophobia is a disease of the nervous class, the means to obviate its access should seem to be such as diminish sensibility and irritability, and give tone and vigour to the system. Bark, steel, cuprum ammoniacum, or flowers of zinc may therefore be administered; and the patient should be directed to use the cold-bath frequently. If his mind be agitated, or depressed, laudanum will occasionally be required. I have reason to think, that the late Mr. Hill, of Ormskirk, in some cases, joined opiates with his once celebrated specific. To the use of this popular nostrum, if the patient entertain much confidence in it, there can be no reasonable objection; because only a few doses of it are recommended, and consequently it cannot long interfere with the exhibition of other more active medicines. Perhaps it may be degraded in the estimation of the faculty, by not being administered in adequate quantities, or with sufficient perseverance. To infallibility no remedy

yet known can have any just pretensions: and the instances of the failure of the Ormskirk powder are not more numerous than those which have been recorded of every other mean hitherto employed. It is indeed composed of ingredients of no great efficacy in ordinary cases, so far as we can rely on the analysis which has been given of it. But activity or inertness are relative, not absolute, qualities in medicinal substances, and their energies, with respect to the human body, depend on the state of the animal system at the period when they are administered. Experience, therefore, is the only test of their inefficiency or power. In other cases we find that apparently simple means produce very salutary effects. Thus milk is an useful solvent when arsenic has been received into the stomach: and I have been informed, by a gentleman of knowledge and veracity, that, in South Carolina, he has seen the poison of the rattle-snake speedily counteracted by the juice of plantane and horehound *. I have

* This gentleman was on a visit in South Carolina when a servant was bitten in the hand by a rattle-snake. Ligatures were instantly applied near the part, but the hand and arm swelled; the jaw became somewhat locked; and the man appeared to be in a state of considerable danger. The surgeon administered to him, by spoonfuls, at short intervals, the juice of plantane and horehound; and the wounded part was covered with a cataplasm of the same herbs bruised. The salutary effects of these remedies were soon apparent, and the servant afterwards perfectly recovered. Mr. Catelby is of opinion that no remedy is yet discovered for the bite

enlarged on this topic, not from any degree of faith in the powers of the Ormskirk powder as an anti-

bite of a rattle snake; yet he acknowledges the having seen recoveries, but imputes them to the efforts of nature, and to the slightness of the bite. How far this may be true of the case above related I shall not attempt to decide; but the observation reminds me of an important distinction, made by Boerhaave, on the comparative danger of infection by a mad dog under the different stages of his malady.

Since this paper was written, Dr. Darwin has obligingly communicated to me a passage from Abbe Grosier's Description of China (Vol. I. page 279), in which it is said, "that people are
" often bitten by serpents at Tang-king, and are cured by applying to the wound a stone resembling a chestnut, which is called
" serpent stone. The stone, after pressing out the blood, is applied
" to the wound, to which it adheres, sucking out the poison, and
" then falls off. It is then well washed in lime water, and dried,
" and applied a second time to the wound; or another stone may
" be used; and thus the poison is extracted." Whether the Abbe's observations may be relied upon it is not easy to decide; but certain it is that an absorbent earth acts forcibly by the attraction of capillary tubes, as any one may experience by holding a fresh-burnt tobacco pipe between the lips. The poisoned wound, however, must be both recent and superficial to be cleansed by such a remedy. The Bramins of India expose to sale an antidote, which they pretend to be taken out of the head of the hooded serpent. Redi, however, asserts, that it is made of calcined hartshorn, which is an active absorbent. On this occasion you will recollect the fact lately transmitted to you by Dr. Waterhouse, Professor of Physic at Cambridge, in New England, that when a rattle-snake bites the nose of a dog, he digs a hole in the ground, lays his head in it, and is commonly cured. It is probable that the surface of the earth is in a very adust, and consequently absorbing state, in those

dote to the canine poison, but to obviate prepossessions, which mislead investigation, and obstruct the attainment of a successful remedy in this most dreadful of human disorders.

III. The accession of canine madness is uncertain as to the distance of time from the bite, and the symptoms by which it first manifests itself. But frequently the cicatrix becomes hard and elevated; pains shoot from it towards the head; it is surrounded with livid or red streaks; and the wound breaks out afresh. The friends of the patient should be apprised of the appearances which are to be suspected, that they may be sedulously watchful, and give instant notice to the medical practitioner employed of the change which has occurred. In this first stage of the disease a large dose of thebaic extract should be administered, to obtain, if possible, a truce. This remedy seems appropriate to various symptoms of the hydrophobia; and we might have hoped it would have merited our entire reliance, from Mr. Pott's assurances of its great efficacy in the painful mortification of the toes, which is somewhat analogous in its commencement. But experience has shewn that it produces no lasting bene-

those parts of America where such accidents occur; and that the nose of this animal is less susceptible of being injured by poison, from its coldness, and from the slime with which it is covered, than any other part of the body.

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fit; and recourse must be had, without delay, to some other medicine, adequate to counteract the impression of the canine poison by another impression, equally forcible, on the nervous system *. The qualities of the fox-glove, and its quick action, seem to recommend it to our trial on this occasion. It affects the brain very powerfully; excites long-continued sickness and vomiting; and has been supposed to produce a copious flow of saliva †. The last effect may be promoted by mercurial unctions, from which, in a few instances, some benefit seems to have been derived.

The propagation of local nervous irritation to the brain is manifest in certain cases of epilepsy, and is obviated by tight ligatures. This fact seems to point out a similar treatment of the hydrophobous patient, as soon as the part bitten shews any signs of infection. Whether excision may then be advisable must be determined by its situation, and by circumstances, about which the attending physician or surgeon can alone decide. Should the wound open it may be dilated, and washed with tepid water; after which the gastric juice may be again applied.

* Probably the efficacy of half drowning the patient, which practice is said to have been successful in a few instances, must have arisen from the counter-impression made on the nervous system.—*Vide* Vanswieten, Comment. Vol. III. page 559.

† See Withering on the Fox Glove, page 184.

It has been found highly serviceable in foul ulcers, and is quick in producing its effects. It sweetens their fœtor; eases lancinating pains; and corrects even the cancerous acrimony. Over the dressings a fermenting cataplasm may be laid, composed of flour, honey, water, and yeast.

Such are the additions to your means of prevention, and such the curative plan, which I take the liberty of suggesting to your consideration. Both may perhaps seem superfluous to you, whose generous zeal, for the good of your fellow creatures, has elevated hope into confidence, and makes you say of the sufferer, in the language of a well-known amiable character, "he shall not die." I heartily wish that experience may fully confirm your sanguine expectations. But though I highly approve of your proposal as judiciously conceived, bidding fair to be successful, and so easily practicable, that it should be adopted, after the bite of every animal, to obviate even unsuspected danger; yet at present I can regard it only as a rational hypothesis on a subject still remaining in much obscurity. We are ignorant of the peculiar properties of the canine virus; of the mode of its communication; and the parts of the animal system affected by it. Are we then qualified to advance one step beyond conjecture? and ought we to rest satisfied with mere ab-
lution, when it is uncertain what time is required
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for the agency of the deadly poison, and whether its baneful operation may not be accomplished even before the completion of the speedy process you have pointed out? But admitting, what I sincerely hope may be found to be the truth, that the plentiful affusion of water will prove an effectual means of prevention, there will still remain the necessity of a curative plan in those cases, wherein the former has been neglected, or in which the disease has unexpectedly occurred.

I shall think myself happy if the hints I have proposed merit your approbation: but it will render me still more happy if they incite you to extend your researches, and afford aid to your enlightened mind, in perfecting its discoveries on the important object of your investigation. *Fungar vice cotis—non inani munere.*

Manchester,

May 1, 1789.

P O S T S C R I P T.

August 11, 1789.—Before this paper was sent to the press I had not perused the valuable Observations on the Cause and Cure of the Tetanus, by Dr. Rush, of Philadelphia. He has obligingly sent me the volume of Medical Inquiries in which they are

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contained; and in the Appendix to his Essay I am much pleased to find a coincidence in our ideas of the analogy between tetanus and hydrophobia. I shall transcribe the passages which have a reference to it.

“ The more I have considered the causes and
 “ symptoms of Hydrophobia, the more I am dis-
 “ posed to ascribe it to the same proximate cause
 “ as the tetanus. 1. They both affect the muscles
 “ of deglutition. I have lately seen a tetanus brought
 “ on by a fractured leg, in which an attempt to
 “ swallow the smallest quantity of liquid produced
 “ the same sudden and general convulsions which
 “ occur in the hydrophobia. 2. They both pro-
 “ ceed from causes which appear to be related to
 “ each other, viz. from wounds, and from the action
 “ of cold, after the body has been previously weak-
 “ ened by heat and exercise. 3. They both some-
 “ times appear as symptoms of the same idiopathic
 “ disorder, viz. the hysteria. 4. They both yield to
 “ the same remedies, viz. to the excitement of an
 “ inflammation in the wounded part of the body,
 “ or to a long-continued discharge of matter from
 “ it, and to mercury.

“ If more facts should occur, which shall shew
 “ the relation that the tetanus and hydrophobia
 “ have to each other, perhaps we may be led to
 “ conclude

“ conclude, that the wound inflicted by the teeth
“ of a dog sometimes acts in the same manner in
“ producing hydrophobia that wounds made by a
“ nail, or any other lacerating instrument, act in
“ producing tetanus, and that both diseases may be
“ prevented or cured, with equal certainty, by the
“ same tonic remedies.”

The tetanus is ascribed, by Dr. Rush, to relaxation: and in the cure of it, he says, it is necessary not only to restore the ordinary tone of the system, but to produce something like the inflammatory diathesis. A splinter under the nail, he affirms, produces no convulsions, if pain, inflammation, or suppuration follow the accident; and that the spirit of turpentine acts, by the excitement of pain and inflammation, in all wounds and fractures of tendinous parts. He has never known a single instance of tetanus from a wound to which this remedy had been applied in time. In the island of St. Croix the negroes, he relates, always apply a plaster, made of equal parts of salt and tallow, to their fresh wounds, to prevent the locked jaw; and that the salt never fails to produce some degree of inflammation,

These facts confirm the propriety of applying the gastric juice to the part bitten by a supposed rabid animal, because it is powerfully stimulant, as well as
penetrating

penetrating, solvent, and detergent; and if rennet be substituted, as recommended in page 161, there will be no necessity for separating any more of the salt than what adheres to it superficially.

To Dr. LETTSOM.

SIR,

London, December 4, 1792.

ON reading several melancholy accounts a few months since, of the fatal effects of the Hydrophobia in some parts of the country, and recollecting with what little success medical aid has hitherto in general been called in, in that most alarming disease, I was induced to communicate to you the mode of treatment for many years, and in many instances, adopted by two practitioners, well known to me, with so much success, that it was never known to fail; although in one particular instance the remedies were not administered until the unhappy patient was actually seized with the most raving symptoms: and yet, although its success was dispaired of, it happily saved the life of the patient, to the great astonishment and satisfaction of his relations.—The above person enjoyed health for many years, and I believe is still living.

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In other instances, the remedies being exhibited in proper time always *prevented* the disease; and in order to ascertain the certainty of the animals being mad, they have in several instances been tied up, and (which was sufficient to do away all doubts) have died raving mad;---these animals were either dogs or cats.

The remedies employed were camphor, mercurius emeticus flavus, and sea-bathing. Ten grains of the first, and six of the second were given the patient (if an adult) to be taken *very early* the morning after application, in bed (between blankets), and to drink plentiful draughts of warm diluting liquors. This generally produced a very sensible effect, either by vomiting, purging, or sweating. The patient was also ordered to make use of the third remedy as soon as possible, and in the most effectual manner, by being plunged in, and instantly taken out again (and this repeated several times in immediate succession), by another person. These remedies were afterwards repeated in the same manner, about two days before the full and change of the moon, for the space of six weeks, or two months.

I intended to have communicated these circumstances to you some months since, but having postponed it for several times from day to day, it at
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last slip of my memory. However, looking over my papers of memorandums this day, I came to one which put me in mind of it, I therefore sat down the first leisure moments I had, to transmit them to you. You are therefore at liberty to dispose of them in such a manner as in your judgment shall seem best. Whether or not you have ever known the same remedies tried I know not; but from the success which to my own knowledge have attended them, and in hopes of contributing in some measure towards alleviating the miseries of my fellow-creatures, I was induced to take this liberty of communicating the same to you,

I remain, with respect,

Yours, &c.

W. C.

P. S. I had almost forgot to say, that with respect to the wounds made by the animals in the flesh of the patients, nothing particular was done to them.

Extract

Extract of a Letter from Mr. Hoffmann, Surgeon to the King of Prussia, now at Edinburgh, to Dr. Ferriar, of Manchester, dated Edinburgh, December 8, 1792, communicated to Dr. Lettsom by Dr. Percival.

“ GIVE me leave to mention to you a case of
“ Hydrophobia Vera without the bite of a mad
“ dog. A man got cold, and had all the symptoms
“ of pleurisy. He was bled, and treated upon the
“ antiphlogistic plan: the respiration, however,
“ remained difficult, and the following day the
“ patient could not take any fluid without falling
“ into convulsions and tetanus; he was bled again,
“ and a blister was applied on the whole neck, but
“ the convulsions continued, with a constant dis-
“ charge of saliva, and he now attempted to bite
“ every person who came near him; these symp-
“ toms continued twenty-four hours, when the
“ patient died. By dissection, all the vessels of the
“ brain were found very much distended with
“ blood, and in the sinus longitudinalis the blood
“ was of a black colour, and nearly conglobated.
“ The third ventricle of the brain was full of water;
“ the diaphragm was inflamed in one part near
“ the middle, and throughout of a red colour.
“ The liver had a gangrenous spot; the stomach
was

“ was small and contracted; the intestines were
“ much inflated with air, and in several parts in-
“ flamed; the upper part of the œsophagus was
“ also a little inflamed. I think it is very clear, in
“ this case, that the Hydrophobia was entirely a
“ symptom of inflammation produced by cold.
“ The case is related by Mr. Thedon of Berlin.”

The preceding pages were reprinted by the Editor, principally to distribute among his Correspondents, with a view to acquire, as well as to convey, information. He solicits therefore communications, in order to render a subsequent Edition more worthy of public attention.

F I N I S.

The Members of the Medical Society of London, associated for the purpose of promoting medical knowledge, sensible of the dangerous influence of poisons in general, on the human body, have adopted the following resolutions.

Prize Medals, offered by the Medical Society of London.

Bolt-court, Fleet-street, 1791.

THE Society resolve to give annually, a Gold Medal, called the FOTHERGILLIAN MEDAL, of Ten Guineas value, to the Author of the best Dissertation on a given subject; to which the Learned of all nations are invited as Candidates.

The Medal for the year 1792 will be adjudged to the Author of the best Dissertation, in answer to the following question :

“ What are the Effects of *MINERAL* Poisons,
 “ upon living Animals, and more particularly upon
 “ Mankind, when taken internally, or applied ex-
 “ ternally ; and what are the most efficacious means
 “ of counteracting these effects ? ”

Question for the year 1793.

“ What are the Effects of *VEGETABLE* Poisons,
 “ upon living Animals, and more especially upon
 Z “ Mankind,

“ Mankind, when taken internally, or applied externally ; and what means are most efficacious in counteracting these effects ? ”

For the year 1794.

“ What are the Effects of *ANIMAL* POISONS, either by internal or external applications, upon living Animals, and especially upon Mankind ; and what are the most efficacious means of counteracting these effects ? ”

For the year 1795.

“ What are the Effects of *ÆRIAL* POISONS, upon living Animals, and especially upon Mankind ; and what are the most efficacious means of counteracting these effects ? ”

N. B. It is desired that every Answer to any of the foregoing Questions may, as far as possible, be founded upon actual experiment, or well authenticated facts. And that the several Competitors will, if practicable, ascertain the specific or characteristic Symptoms of each particular POISON ; in order to assist MEDICAL PRACTITIONERS not only in their endeavours to afford relief, but in the evidence which they may be required to give upon questions of this nature in any Court of Justice.

REGULATIONS RESPECTING THE MEDAL,

I. Each Dissertation shall be delivered to the Secretary, in the Latin, English, or French language, on or before the first day of November, of the preceding year; and the adjudication of the Medal shall take place in the last week of the ensuing February.

II. With each Dissertation shall be delivered a sealed packet with some motto or device on the outside; and within, the Author's name and designation; and the same motto or device shall be put upon the Dissertation, that the Society may know how to address the successful Candidate.

III. No paper with the name of the Author affixed can be received; and if the Author of any paper shall discover himself to the Council, or to any Member thereof, such paper shall be excluded from all competition for the Medal.

IV. All the Dissertations, the successful one excepted, shall be returned, if desired, with the sealed packets unopened.

* * * The Society propose to give two Silver Medals annually: one of which shall be adjudged for the best Essay, read before the Society within the year, written by a Fellow; the other for the best Essay, by a Corresponding Member, or by any Person not a Member of the Society.

